15th Annual Report

Economic Policy Council and Office of Economic Policy

STATE OF NEW JERSEY

Trenton, 1983

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May 27, 1983

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

Dear Governor Kean:

The Economic Policy Council is pleased to submit its 15th Annual Report in accordance with Chapter 129 of New Jersey Public Law 1966.

This Report contains studies of several aspects of the New Jersey economy and provides policy recommendations based on our findings.

The first study establishes criteria to identify high technology industries and goes on to assess the performance of New Jersey's high technology manufacturing sector. The conclusion is that the State has not reached its potential in developing high technology industry.

The second chapter analyzes pending urban enterprise zone legislation. The analysis indicates that the criteria for selection in the federal proposal will make it difficult for the State's cities to receive designation as enterprise zones.

Mortgage subsidies are examined next in Chapter III with the objective of maximizing the benefit of any future State mortgage subsidy program.

Chapter IV is an analysis of local expenditure cap laws. This study concludes that ratable losses are currently treated in a way which allows the tax rates of certain cities to increase too fast and, therefore, contributes to further economic decline.

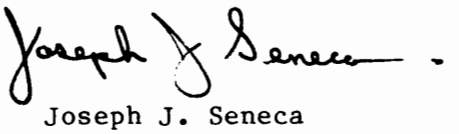
Chapter V develops a model of state spending levels based upon various economic and demographic variables. An examination of New Jersey expenditure levels, in light of the established relationships, reveals that the State's spending is consistent with other states given New Jersey's economic and demographic characteristics.

This year, as usual, many people assisted us in both our ongoing research activities and in preparing this Annual Report. We especially wish to thank State Treasurer Kenneth Biederman and Commissioner Borden Putnam of the Department of Commerce and Economic Development for their encouragement and continued support of our Office; Thaddeus Maciag of the Governor's Office; Gerald Trimble of the Department of Banking; Constance Gibson of the Mortgage Finance Agency; William Hills of the Treasury Department; Beverly Railsback of the State Library; James Gibson of the Department of Agriculture; and Shirley Goetz and Vivien Shapiro of the Department of Labor, for their assistance. In addition, we would like to thank Dr. Neil Sheflin of the Rutgers University Bureau of Economic Research for his help in our input-output model. Finally, we wish to thank Carol Maslowski for her preparation of the manuscript.

We also would like to note that our Office will greatly miss the services of George Nagle, but we are happy to congratulate him on his advancement to Director of the Office of Economic Research, Department of Commerce and Economic Development. We wish to thank Mr. Nagle for his many contributions over the years including those in this year's Report.

The Council and Office appreciate the interest that you have shown in our activities and research findings.

Respectfully submitted,



Joseph J. Seneca

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PREFACE

This Annual Report is the second of the two major yearly publications of the Economic Policy Council and Office of Economic Policy. It contains the policy studies and research papers of the Council and Office. Our preceding publication, the Economic Report of the Governor, completed last summer, reviewed the performance of the New Jersey economy and provided an economic outlook for fiscal year 1983. This forecast was updated in December 1982 with a revised economic outlook for the State for the calendar year 1983. The division of the Council's publications into these two parts reflects a decision to separate our economic policy studies and recommendations, which represent our professional, independent judgement concerning important issues facing the State's economy, from the presentation of the factual evidence of the economy's recent performance and our assessment of its likely future course over the next year.

I. Review of Studies

This Annual Report contains five studies by the Council and Office. New Jersey, like many other states, is attempting to promote high technology industries in order to increase employment and income growth. The Governor has appointed a high-level Science and Technology Commission charged with making recommendations to stimulate high technology industry in New Jersey and the Legislature is engaged in a parallel effort. Chapter I attempts to answer a necessary initial question in this attempt to attract and expand the high technology sector -- namely, what is high technology and how have these industries performed in New Jersey? Chapter I develops criteria for identifying high technology industry and then measures how the State's high technology manufacturing sector has performed. The general conclusion is that New Jersey's high technology industries have significantly lagged behind their U.S. counterparts. This conclusion underlines the importance of the State's efforts to improve its high technology sector.

Chapter II examines the concept of urban enterprise zones and evaluates legislation pending in this area. An analysis is made of the proposed federal criteria which will determine whether an area is eligible for enterprise zone designation. Several significant problems occur when these criteria are applied to New Jersey's cities, and a detailed study of their application to Newark shows the severe difficulties with creating a viable enterprise zone in that city given the current formulation of the eligibility criteria.

Chapter III evaluates the efficiency aspects of state mortgage subsidy programs. The existing state programs are described and an estimate is made of the counter-cyclical effect induced in the housing sector by an interest subsidy program. The results show that, while the fraction of the subsidies that goes to induce homebuyers is directly related to the size of interest subsidies, the absolute number of induced purchases increase at first and then decrease as the number of points by which mortgage interest rates are reduced.

Last year, Governor Kean appointed the Local Expenditures Technical Review Commission, charged with examining the performance of the municipal expenditure cap laws. Chapter IV is the result of our participation in that Commission's work. The Chapter analyzes the relation between the limitations on spending imposed by the cap and the resulting effects on the actual objective of the cap, namely local property tax rates. The Chapter reviews the existing cap laws and shows that the difference between limiting local government expenditures or directly constraining local property tax rates lies in the treatment of losses from the local tax base.

Finally, Chapter V analyzes various categories of state spending and compares New Jersey spending levels to U.S. averages for all states. The study develops estimates of state spending levels based on prevailing economic and demographic variables and compares these estimates of New Jersey spending levels to actual State spending. The general conclusion is that New Jersey spending levels are in line with what would be expected given New Jersey's economic and demographic conditions.

II. Research Agenda

Over the next year the Council and Office intend to pursue work in several areas. First, we will continue our on-going efforts in state economic modeling. The linkages between the national and state econometric models will be refined, and additional changes will be made in the structure and content of the state model. The objective is to continue to improve the model's usefulness for policy simulation.

We intend to return to our work on the export performance of New Jersey industry and foreign investment trends in the State. We will update our previous analysis in this area* and examine the relationship between foreign investment in New Jersey and import behavior. The objective will be to target economic development efforts on the most likely foreign investment opportunities in the State.

We also wish to examine in more depth the relation between the service and manufacturing sectors. The issue here is most important -- namely, can New Jersey's economy sustain economic growth in the face of continued imbalances in the development of these two sectors.

We will also continue our work on urban New Jersey by studying the economies of the State's major cities. The objective is to describe these urban economies in some detail and to indicate where significant opportunities exist for private sector economic growth and to suggest appropriate policy actions in order to take advantage of these.

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*See Chapters IV and V of the 12th Annual Report of the Economic Policy Council and Office of Economic Policy, Trenton, 1979.

Our work in this Report on high technology industry will also be extended. In particular, we want to compare New Jersey's high technology sector with that in other competing states. We also want to try to find out why the high technology manufacturing industry is performing relatively poorly in New Jersey. The objective of this analysis will be to develop policy recommendations aimed at improving this performance.

Finally, we will continue our economic reviews of the State's economy and provide periodic forecasts of economic conditions in New Jersey.

I

THE PERFORMANCE OF HIGH TECHNOLOGY MANUFACTURING INDUSTRY IN NEW JERSEY*

The words "high technology" have become the familiar, if nebulous, economic development slogan of the 1980's. "High Technology" is continually invoked as the battlecry in the competition for economic growth both between and within nations. Several recent federal laws have attempted to stimulate high technology development and a large and growing number of states have launched ambitious and expensive programs aimed at increasing their share of high technology employment.

This economic scramble among the states has sharpened as state governments increasingly come to view "high technology" as a potential escape from the slow economic growth and high unemployment conditions left by the national recessions of 1980 and 1981-82. This same intense competition is replicated internationally as nations vie for the economic benefits associated with the development of new products and processes.

A fundamental and troublesome question, however, should logically precede the formation of any extensive economic development strategy focused on stimulating "high technology." Namely, what is "high technology"? "High technology" has multiple dimensions and can be viewed, for example, from an engineering, economic, scientific or even philosophic perspective. An engineering definition might specify that a high degree of technical innovation be present in the product or production techniques. A scientific description might rely on whether the most recent basic scientific discoveries are being used in the production process. A philosophic view could attempt to understand the direction of scientific advance and its dissemination at a given point in time. Accordingly, a single, precise definition of the term is likely to remain elusive.

Nevertheless, a common theme underlying any such assessment of high technology is that in its broadest terms, high technology reflects the creativity of humankind as embodied in the advancement of scientific knowledge. From an economic perspective, however, it is important to bring the somewhat evasive concept of "high technology" down to the level of its commercial application -- i.e., the production of specific consumer and capital goods associated with the application of this knowledge.

Any thoughtful high technology development strategy (at the federal or state level) cannot be as effective as possible without first measuring the content and performance of high technology industry. The purpose of this Chapter, therefore, is to identify that group of industries which come

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

closer (than other groupings) to capturing this notion of high technology -- i.e., which industries most embody the scientific advancement of human creativity as manifested in both the means of production they use and the products they produce. While this is not a definition of high technology, it does provide an opportunity to assess the performance of what we can call high-technology content industries.

In order to be informative for policy making, the selection of these industries must be based on a comprehensive examination of all production activity, i.e., the full range of manufacturing industry must be surveyed. In addition, a predetermined set of criteria must be developed to identify high technology industries in order to make the identification as objective as possible. Accordingly, we have developed several economic criteria and applied these to four-digit industries using Standard Industrial Classification (SIC) data from the latest census years of manufacturing -- 1972 and 1977.[1] This four digit SIC data represents the most comprehensive data source available for any analysis of the U.S. manufacturing sector. This does not mean, however, that this is the ideal data for assessing high technology industry. The use of Census of Manufactures data limits the choice of criteria. Certainly, more sophisticated measures could be conceived; e.g., data at the 6 or 7 digit SIC level would permit a much more homogeneous definition of product; or, an examination of the detailed educational background of industrial labor forces (e.g., number of engineering degrees, scientific degrees, etc.) would reveal the labor skill requirements of specific industries. However, no data for these two examples, nor for other similar detailed criteria, are available on a systematic, comprehensive basis for all U.S. industry.[2]

The organization of the Chapter is as follows. Section I discusses the methodology and the rationale for the criteria by which high technology content industries are identified. A distinction is made between industries which use a high technology process to produce conventional goods and services[3] and those industries which produce high technology products.[4] Although this distinction is blurred (some industries do both -- i.e., use high technology methods to produce high technology products)[5], it is useful and informative to separate such industries where possible. Based on the criteria developed, Section I proceeds to identify high technology product and process industries. In Section II an evaluation is made of the performance of these industries in the U.S. and in New Jersey. Section III concludes the Chapter with several qualifications of the analysis and

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1 The 1982 Census of Manufactures data are not yet available and there is some question as to whether the 1982 data, unlike the 1977 and 1972 censuses, will ever be available in published form at the state level.

2 SIC data at levels more disaggregated than 4 digits are not published at the state level.

3 An example of this type of industry would be the production of shoes using highly automated processes, including robotics.

4 Examples of such industries commonly thought of as high technology would be computers, genetic engineering, and military aircraft.

5 Recall, using a 4 digit level of aggregation also will imply that some industries are likely to have both conventional and high technology outputs in their product definitions.

makes some suggestions for additional work.

I. Selection of High Technology Industries

Three economic criteria are used in the selection process of high technology industries. These criteria are described in detail below and a rationale is given in each case for their use. The method of selection is also outlined and there is a description of the procedure used for dividing the selected high technology industries into product and process categories.

The first criterion measures the average growth in the value of total shipments (in constant dollars) of all four digit U.S. manufacturing industries between 1972 and 1977. Each of the 452 four digit industries is then compared to this national average, and those four digit industries whose growth rate in total shipments exceeds this national average are placed in a pre-selection group of industries. Table 1, row (a) gives this national growth rate average (16%) and shows that 174 industries exceeded it. The rationale for using an economic growth criterion to assist in identifying high technology industries is that relatively high economic growth is a likely characteristic of the spread of high technology industries. Not all industries with above average growth will have high technology content, but we suspect the reverse to be generally true -- i.e., high technology industries are likely to experience superior growth. Thus, a growth measure becomes the first, but not the exclusive, selection criteria.

The second criterion measures the most recent (1977) level of productivity -- value-added per employee -- and repeats the process described above. The national average level of value-added per employee for all manufacturing $29,871, is exceeded by 194 industries and these form a second pre-selection group (see Table 2, row b). This second criterion of a relatively high value-added performance is intended to serve as a proxy for those industries characterized by high capital-labor ratios (which are not di-

Table 1
U.S. AVERAGES AND NUMBER OF PRE-SELECTED INDUSTRIES

	U.S. Average All 4 Digit Industries	Number of 4 Digit Industries U.S. Average
a. Growth Rate in total shipments (in constant $, 1972 to 1977)	16.0%	174
b. Productivity (1977): Value-Added per Employee	$29,871	194
c. Share of non-production workers in total employment	31.2%	100

Table 2
SHARE OF HIGH TECHNOLOGY INDUSTRIES IN TOTAL U.S. MANUFACTURING

	(a) Value-Added*		(b) Employment		(c) Capital Expenditures	
	1972	1977	1972	1977	1972	1977
1. Product	12.8	12.8	9.4	10.4	7.7	8.6
2. Process	9.6	9.8	6.5	6.6	10.6	10.9
3. All H-T Ind.	22.4	22.6	16.0	17.0	18.3	19.6

*In current dollars.

rectly observable). High capital-labor ratios in turn reflect capital intensive industries and are also industries which are likely to require a relatively skilled (and hence higher paid) labor force. Such industries are likely to be consistent with the high technology content activities we are seeking to isolate.

Finally, the same procedure is followed for a third criterion, namely, the share of non-production workers in total industry employment. This yields a third pre-selection group of 100 industries (Table 1, row c). This measure, unlike the other two, which are defined in dollar terms, is a direct indicator of labor force characteristics. This criterion takes into a third pre-selection group, those industries which have an above national average share of non-production workers in their total employment (Table 3, row c). Non-production workers are generally

Table 3
SHARE OF NEW JERSEY HIGH TECHNOLOGY INDUSTRIES IN TOTAL NEW JERSEY MANUFACTURING

	(a) Value-Added*		(b) Employment		(c) Capital Expenditures	
	1972	1977	1972	1977	1972	1977
1. Product	17.3	17.4	11.9	11.7	13.6	13.4
2. Process	5.5	5.8	4.2	4.4	5.7	6.2
3. All H-T Ind.	22.8	23.2	16.1	16.1	19.3	19.6

*In current dollars.

characterized by higher educational attainment levels compared to production workers, and, as a result, are more likely to possess relatively sophisticated skills and training. Thus, the rationale here is to identify those industries which require a more highly skilled labor force, and hence are likely to be consistent with our general concept of high technology. A more direct measure would be superior for our purpose here, e.g., the percentage of scientists and engineers employed in each industry -- but such data are not available for all manufacturing industry at the national and state levels.

In summary, the three criteria employed in the selection process include a measure of economic growth, a measure of productivity, and an indicator of labor force skill requirements. The result of applying these criteria to the Census of Manufactures data yields three overlapping groups of four digit industries which represent an initial list of industries that can be identified potentially as high technology. That is, a superior performance in these measures by any industry makes it a likely candidate for designation as an industry having high technology content. However, superior performance may be too broadly defined by simply identifying those industries which are above the average national performance in each indicator.[6] Therefore, in order to ensure further that we are isolating an appropriate group of high technology industries, additional constraints were imposed on this pre-selection group. Specifically, the entire process was repeated -- i.e., new averages were computed based only on the pre-selected groups of industries and only those individual 4 digit industries whose performance exceeded the average of the pre-selected group qualified for each of three final high technology industry groups.[7]

Any industry which met at least two of the three second-stage criteria was then placed in a final list, which totalled 46 industries. These 46 industries, taken as a group, represent our designation of those U.S. manufacturing industries which possess high technology content in either their methods of production and/or in their final products.

The last step was to separate this final group into high technology product and high technology process industries. The argument behind this division is that high technology product industries are likely to exhibit relatively high economic growth and to have a relatively high share of non-production workers (i.e., meet the first and third criteria) while high technology process industries are more likely to be characterized by high value-added per employee (sophisticated production processes with high capital intensities) as well as the other two characteristics. While this distinction did not produce a mutally exclusive separation of the 46 industries, it was used, along with some judgement (based on SIC descriptions)

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6 An initial analysis conducted earlier by the author and Louise Westerholm stopped at this first stage definition of high technology -- i.e., any industry whose performance exceeded the national average was designated as a high technology industry. See draft report to the Rutgers Committee on Business-University Cooperation in High Technology Development.

7 Although this second stage procedure necessarily eliminated many industries, it was not applied mechanically in all cases. Each of the three final industry groups was examined and judgments were made to add or delete several industries which were on the margin in each of the three categories.

to produce a division of industries into 26 high technology product industries and 20 high technology process industries. The objective here is not to argue that each and every industry in both groups is justifiable as purely a high technology process or a high technology product industry,[8] but rather that each group, taken as a whole, is sufficiently distinctive so that in one group the notion of a sophisticated product prevails while in the other the prevailing theme is one of a sophisticated process, producing conventional outputs. The industries in each group -- product and process -- are listed in the Appendix and the analysis of Section II is conducted in terms of the economic performance of each of these two groups, as well as the two groups combined.

II. Performance of High Technology Industries: New Jersey and U.S.

This section will examine the performance of those industries identified as high technology industries. First, there is an analysis of the shares of these industries in total value-added, employment and capital expenditures in both the New Jersey and the national economies, including an examination of how these shares have changed over time. The analysis is then extended to examine New Jersey's relative share of the nation's high technology industry. Finally, a comparison is made between the growth of high technology industries in New Jersey and in the U.S.

A. High Technology Shares

Table 2 lists for the entire United States the share of high technology industry (product, process, and all high technology combined) according to three measures of economic performance -- total U.S. manufacturing value-added, total employment, and capital expenditures, in 1972 and 1977. The data indicate that high technology's share of value-added has essentially remained constant from 1972 to 1977, at approximately 22.5% of total U.S. manufacturing value-added (column a, row 3). Individually, the value-added share of high technology product and process industries also show little change over this period (rows 1 and 2). However, the share of high technology employment in total U.S. manufacturing employment increased by one percent (16% to 17%, row 3, column b). This represented a gain in employment of 290,000 jobs. Moreover, almost all of this increase occurred in high technology product employment, which grew from a 9.4% share in 1972 to 10.4% in 1977 (row 1, column b). High technology process employment's share showed little change.

Finally, the share of capital expenditures by high technology industries in total manufacturing capital expenditures increased from 18.3% to 19.6% (row 3, column c). Once again, most of this increase occurred in high technology product industries (7.7% to 8.6%).

Table 3 repeats the analysis for New Jersey and examines the share of the State's high technology industries in the New Jersey manufacturing sector. In terms of value-added, New Jersey's high technology industry increased its share from 22.8% to 23.2% between 1972 and 1977 (column a, row 3). This increase is somewhat larger than the equivalent change nationally (22.4 to 22.6). Most of New Jersey's increase in high-technology's value-added share occurred in high technology process industries (5.5% to 5.8%,

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8 Indeed, the four digit level of aggregation will imply that some industries produce both high technology and conventional products.

column a, row 2). In general, New Jersey's share is roughly comparable to the nation's -- 22% to 23% of all manufacturing value-added (column a, row 3).[9]

The first sign of concern, however, appears in the measures of employment share (column b). In 1972 high technology employment in New Jersey represented 16.1% of total manufacturing employment (row 3). This was virtually identical to high technology's employment share nationally (16% in Table 2), although the distribution of this employment between high technology product and process did differ. Employment in high technology product industries in New Jersey represented 11.9% (row 1) of total employment while nationally it was 9.4% (Table 2). Only 4.4% of total manufacturing employment in New Jersey was in high technology process industries while the equivalent number nationally was 6.5%.

By 1977 high technology employment nationally increased its share by 1% from 16% to 17% (previously discussed in Table 2, row 3), with increases occurring in both components of high technology employment -- product and process.[10] In New Jersey, however, high technology's employment share did not change between 1972 and 1977, remaining at 16.1% of total employment. The small increase in the share of high technology process employment (4.2% to 4.4%, row 2) was offset by a decline in high technology product employment (11.9% to 11.7%). Thus, although New Jersey's high technology product employment share in 1977 (11.7%) was still above the nation's (10.4%), the State's share in this area actually declined while nationally this component was increasing. To put this in further perspective, it should be noted that nationally, total manufacturing employment increased over this time while in New Jersey manufacturing employment fell. Thus, nationally, high technology employment's share, in terms of product, process, and both groups together, increased during a period of an overall expansion in manufacturing employment while in New Jersey the share fell, even though total manufacturing employment during this time also declined. The implications of these changes in shares for the relative growth of the New Jersey high technology sector will be examined in Part C below.

The final New Jersey share measure -- capital expenditures -- shows a pattern similar to the employment measure. Overall, the share of total capital expenditures by high technology industry increased slightly in New Jersey (19.3% to 19.6%). A drop in the share of high technology product capital expenditures (13.6% to 13.4%) was offset by a modest increase in the process category (5.7% to 6.2%). This is in contrast to the national increase of 1.3 percentage points in

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9 It is important to recall that not all industries identified nationally as high technology industries will be found in New Jersey. This is expected since it is unlikely that a single state, constrained by size, will contain all the manufacturing industries found nationally. The objective here is to understand the relative importance in the State's manufacturing sector of those high technology industries which are present in New Jersey and also to see how this relative importance has changed over time. In some cases the industry is present in New Jersey but due to confidentiality restrictions, data are not published.

10 High technology product employment's share increased by a full 1% (9.4% to 10.4%, Table 2, row 1, column b).

high technology's capital expenditure share (18.3% to 19.6%, Table 2), composed of increases in both the product and process groups (see Table 2).

In summary, Table 3 indicates a constant high technology employment share in the State and only small increases in the value-added and capital expenditure shares.

B. Relative Shares: New Jersey vs. United States

Table 4 provides data on New Jersey's share of the national high technology industry. For example, in 1972 New Jersey had 6.3% of national high technology value-added (column a, row 1). Thus, the analysis of Table 4 shows New Jersey's importance in the national high technology manufacturing sector.[11] The same three performance measures are used -- value-added, employment and capital expenditures. In addition, for a further perspective, row 4 provides measures of New Jersey's share in all U.S. manufacturing.[12]

In terms of value-added (column a) New Jersey's share in total U.S. high technology value-added declined from 4.7% in 1972 to 4.0% in 1977. Declines occurred in both the high technology product (6.3% to 5.3%) and process (2.7% to 2.3%) categories. These declines mirror the general decline of New Jersey's share in all U.S. manufacturing value-added (4.6% to 3.9%, row 4). Also, in both years, New Jersey high-technology industry had only approximately the same share of U.S. high technology value-added as it had of all U.S. value-added (4.7% vs. 4.6% in 1972 and 4.0% vs. 3.9% in

Table 4
SHARE OF NEW JERSEY HIGH TECHNOLOGY INDUSTRY IN U.S. HIGH TECHNOLOGY INDUSTRY

	(a) Value-Added*		(b) Employment		(c) Capital Expenditures	
	1972	1977	1972	1977	1972	1977
1. Product	6.3	5.3	5.5	4.5	6.8	4.6
2. Process	2.7	2.3	2.8	2.7	2.1	1.6
3. All H-T Ind.	4.7	4.0	4.4	3.8	4.1	2.9
4. Total Mfg.	4.6	3.9	4.4	4.0	3.9	2.9

*In current dollars.

11 Again, it should be noted that not all the 4 digit high technology industries identified at the national level are present in New Jersey.

12 I.e, rows 1 to 3 show New Jersey's share of the total U.S. high technology manufacturing industry, while row 4 indicates New Jersey's share of all U.S. manufacturing.

1977). In other words, New Jersey's manufacturing sector did not contain a disproportionate share of high technology value-added relative to its overall share of all U.S. manufacturing value-added.

This pattern is repeated for the employment measure (column b). New Jersey's share of all U.S. high technology employment declined from 4.4% to 3.8% (row 3), with most of the decline occurring in high technology product employment (5.5% to 4.5%, row 1). Moreover, a comparison with total manufacturing employment reveals that, by 1977, New Jersey was somewhat underrepresented in high technology employment. That is, in 1972 New Jersey had 4.4% of all U.S. manufacturing employment and of all U.S. high technology employment; by 1977, New Jersey's share of U.S. high technology employment (3.8%) was below its share in all U.S. manufacturing employment (4.0%). New Jersey's relative share in capital expenditures (column c) shows the sharpest decline of the three measures (from 4.1% of all U.S. high technology capital expenditures in 1972 to 2.9% in 1977). The decline in New Jersey's share of all U.S. high technology product capitol expenditures was particularly pronounced (6.8% to 4.6%, row 1). In summary Table 4 reveals a declining share of New Jersey's high technology industries[13] in all three performance measures.

Finally, it should be noted that despite this decline, New Jersey's share in all three performance measures in the high technology product industries still exceeded (as of 1977) its share in all U.S. manufacturing industries (row 1 vs. row 4). Conversely, New Jersey's share in high technology process industries was below its share in all U.S. manufacturing industries (row 2 vs. row 4), and has been declining.

C. Growth of High Technology Industries

The analysis of the preceding two parts has been conducted in terms of shares. While changes in actual growth can be inferred from that discussion, it is more informative to do this explicitly. Table 5 provides growth ratios for the three performance measures for both New Jersey and the U.S. for the 1972-77 period. For example, in the U.S., the total value-added of high technology product industries increased 65.6% between 1972 and 1977 (row 1, column a).[14] In general for the U.S., value-added in high technology industries, and in overall manufacturing increased in the range of 65% to 68% with the gain in high technology value-added only

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13 This analysis was repeated using as a comparison only those high technology industries at the national level that were also found in New Jersey. However, declining New Jersey shares -- in all three measures -- emerged although from higher initial levels (since the base comparison group of U.S. industries is smaller).

14 The ratios in Table 5 are calculated as follows: for the value-added example,

$$\frac{\text{1977 U.S. Value-Added (H.T. Products)}}{\text{1972 U.S. Value-Added (H.T. Products)}}.$$

The percentage growth for the period is this ratio times 100, minus 100.

Table 5
GROWTH OF HIGH TECHNOLOGY INDUSTRIES IN U.S. AND N.J.
(1972 to 1977)

	(a) Value-Added*		(b) Employment		(c) Capital Expenditures	
	U.S.	N.J.	U.S.	N.J.	U.S.	N.J.
1. Product	1.656	1.403	1.137	0.916	2.205	1.454
2. Process	1.687	1.475	1.041	0.980	2.029	1.613
3. All H-T Ind.	1.670	1.421	1.098	0.933	2.103	1.501
4. All Mfg.	1.653	1.393	1.030	0.933	1.972	1.475

*In current dollars.

slightly exceeding the increase in all manufacturing (67% vs. 65.3%, rows 3 and 4, column a).[15] New Jersey's increases over the same time, however, were generally 25 percentage points lower than the nation's (ranging from 40% to 47%).

This relatively poor growth performance of New Jersey high technology industry becomes dramatically apparent when changes in employment are examined (column b). For the U.S. as a whole, employment in high technology industries grew 9.8%, with a 13.7% increase in high technology product employment and a 4.1% gain in high technology process jobs. The total growth in all manufacturing employment nationally was 3.0% in the period. Thus, high technology employment grew faster than all manufacturing employment (9.8% vs. 3.0%). Each individual high technology category -- product and process -- also grew faster than overall manufacturing employment. In New Jersey, however, high technology employment fell by 6.7% (100-93.3 in row 3, column b). This decline exactly matched the decline in overall manufacturing employment in the State (row 4). Thus, New Jersey's high technology employment did not outperform the State overall manufacturing sector (employment in both fell by the same 6.7%). Also, in comparison with the U.S., New Jersey's high technology loss of 6.7% in employment contrasts sharply with the national increase of 9.8% in the same industries.

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15 It may be that the increase in the output prices of high technology industry over this period was below that of general manufacturing because of relatively higher productivity gains in the high technology sector. If this is true, then the comparison between value-added changes (recall value-added is measured in current dollars) in all manufacturing and that in high technology industries should be viewed with some caution.

The decline in high technology product employment was particularly steep (8.4%, row 1), while process employment fell by only 2.0% (row 2). Again, in contrast, employment nationally rose in both these categories (13.7% and 4.1%, respectively).

In terms of capital expenditures (column c), high technology capital expenditures for the U.S. increased by 110.3% (row 3) compared to a 97.2% gain in all manufacturing capital expenditures (row 4). The increase in high technology product capital expenditures was particularly large (120.5%). New Jersey's capital expenditure growth lagged well behind those national increases, with overall high technology capital expenditures increasing 50.1% (or under half the 110.3% national gain). High technology product capital expenditures grew even more slowly (45.4%). In New Jersey the differential between the growth of high technology capital expenditures and that for all manufacturing was a slim 2.6%, compared to a 13.1% difference nationally (see row 3 vs. row 4).

Finally, it should be noted that the analysis of Table 5 is conducted from aggregate data for all high technology industries. These data obviously represent the sum of each industry's performance nationally and in New Jersey. Each specific industry, however, can be examined separately and the relative growth of each New Jersey high technology industry, in terms of employment and value-added is listed in the Appendix. An examination of the Appendix shows that the weaknesses observed in Table 5 in the aggregate of New Jersey's high technology industry are general and occur throughout most of the State's individual high technology industries. These results are given in Table 6 which provides a summary of the New Jersey-U.S. employment growth ratios reported in the Appendix.[16] Of the 15 high technology product industries reporting employment data in New Jersey, only 3 had employment growth rates above their national counterparts. Six of the 10 process industries found in New Jersey grew faster, in terms of employment, their national equivalents.

Table 6
INDIVIDUAL INDUSTRY PERFORMANCE

	Employment Growth		
	NJ>/US	NJ</US	Total Industries
1. Products	3	12	15
2. Process	6	4	10
3. All High Technology	9	16	25

16 Employment data are the most frequently reported SIC data and the summary of this measure is used in Table 6.

III. Qualifications and Conclusions

Given the initial definition of high technology, the results of this analysis of New Jersey's high technology sector indicate that the State's performance in this area has been relatively weak. This is true whether performance is measured by New Jersey's high technology share in the State or national economies or by actual changes over time. Between 1972 and 1977, New Jersey's high technology sector did not grow relative to the State's overall manufacturing economy and actually declined relative to the nation's high technology industry. Moreover, in the key measure of employment growth, high technology jobs fell by more than 6% in New Jersey compared to an almost 10% increase in the U.S. New Jersey's growth in high technology value-added and capital expenditures lagged significantly behind the national increases.

This study, however, is certainly not the definitive assesment of the State's high technology performance. Several qualifications must be made concerning the analysis and additional work is needed to understand more fully the State's strengths and problems in the high technology area. These qualifications and some suggestions for future work are given below.

First, the Census of Manufactures data used here extend only to 1977. The data for the 1982 Census are not yet available. It is possible that New Jersey's high technology performance has improved since the time period studied here and a priority extension of this Chapter is to update the analysis when the 1982 state level data appear.[17]

A second, more fundamental, qualification concerns the criteria identifying high technology. As discussed in Section I, the criteria employed here are necessarily constrained to census of manufactures data. More specific criteria -- e.g., the educational attainment of the labor force by industry -- would permit greater precision in identifying high technology industry. Such data are available for selected industries and the initial classification of high technology industries here could be studied further via other data sources.

A third qualification to this study is that it has been confined to the manfacturing sector. Service industries such as telephone communica-

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17 Some partial evidence is available, however, from other data sources to suggest that New Jersey has continued to lag behind the nation in high technology growth. Data from County Business Patterns can be used to extend the analysis to 1980. However, data are only available for employment; the other measures of economic performance -- value-added and capital expenditures -- will only be available with the 1982 Census of Manufactures. Between 1977 and 1980, a period of national economic recovery, employment in all New Jersey's high technology industries grew by 11.5%, while overall manufacturing employment in the State increased by 3.5%. Thus, New Jersey's high technology sector grew faster than all manufacturing and accordingly, increased its share in the State's manufacturing sector. However, nationally, employment in the same high technology industries rose by 21.6%, far above New Jersey's 11.5%. The comparison was even more unfavorable in the State's high technology product industries, where employment grew by 10.4% vs. 28.5% for the comparable U.S. industries.

tions, computer programming and data processing services, for example, are not included in the analysis. The reason for their omission is that equivalent, comprehensive data for the service sector do not exist, particularly at the state level. Certainly, many of these service industries conform to the notion of high technology industries. Moreover, there is evidence that the service sector, in general, has performed well in New Jersey.[18] An analysis of the high technology service sector is certainly warranted, perhaps by using an approach which examines individual firms. It should be noted, however, that many industries thought to be "service industries" are, in fact, included in the manufacturing data used here. Also, even if high technology service industries in New Jersey have been thriving, it is questionable whether any long-run economic development of New Jersey can be sustained without balanced growth between both the manufacturing and service sectors.

Finally, there is nothing in this analysis that points to why New Jersey's high technology sector has lagged behind the national growth of these industries. The possibilities are many, and future research by the Economic Policy Council and Office will attempt to answer this question. Certainly, however, it is important that the State find out why this group of superior industries -- i.e., industries with economic performance measures far above the national average -- has not done well in New Jersey. This leading edge of employment and income growth, representing the frontier of economic development, could become a significant part of the economic future of New Jersey. The efforts of the Governor's Commission on Science and Technology and the Legislature to develop policies to stimulate this sector of the State's economy are timely and well-motivated. The preliminary results of this chapter suggest that they are critically needed.

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18 See, e.g., "New Jersey's Urban Dilemma: Decline within Growth," J.J. Seneca, 14th Annual Report of the Economic Policy Council and Office of Economic Policy, Trenton, N.J., 1981.

APPENDIX
INDUSTRY GROUPS AND PERFORMANCE MEASURES
A: HIGH-TECHNOLOGY PRODUCT

SIC Code	Name	Total Employment Growth NJ/US	Total Value-Added Growth NJ/US
2831	Biological products	3.346	2.900
2833	Medicinals and Botanicals*		
2834	Pharmaceutical preparations	.823	.973
2843	Surface active agents	.747	.691
3511	Turbines, turbine generator sets*		
3555	Printing trades machinery	.875	.999
3569	General industrial machinery	.866	.919
3573	Electronic computing equipment	.895	.533
3576	Scales, balances, ex. laboratory*		
3579	Office machines, typewriters, etc.	.966	.752
3589	Service industry machinery,	.988	1.040
3662 (366)	Radio and TV communication equipment	.673	.642
3674	Semiconductors and related devices	.795	.982
3693	X-ray apparatus and tubes*		
3721	Aircraft*		
3724	Aircraft engines and engine parts*		
3761	Guided missiles, space vehicles*		
3764	Space propulsion units and parts*		
3769	Space vehicle equipment*		
3811	Engineering and scientific instruments	1.815	1.787
3823	Process control instruments	.835	1.138
3825	Instruments to measure electricity	1.200	1.774
3829	Measuring and controlling devices, nec.	.817	.904
3832	Optical instruments and lenses*		
3841	Surgical and medical instruments	.662	.507
3861	Photographic equipment and supplies*		

*Industry data not reported in New Jersey.

INDUSTRY GROUPS AND PERFORMANCE MEASURES
B: HIGH TECHNOLOGY PROCESS

SIC Code	Name	Total Employment Growth NJ/US	Total Value-Added Growth NJ/US
2711	Newspapers	1.050	0.892
2721	Periodicals*		
2731	Book publishing	1.043	0.811
2795	Lithograph platemaking services*		
2813	Industrial gases*		
2819	Industrial inorganic chemicals,	.671	.731
2824	Organic fibers - noncellulosic*		
2851	Paints and allied products	.922	.929
2873	Nitrogenous fertilizers*		
2891	Adhesives and Sealants	1.136	1.525
2899	Chemical preparations, nec.	1.024	.755
3992	Lubricating oils and greases	.917	.775
3211	Flat glass*		
3291	Abrasive products	1.039	1.040
3296	Mineral wool	1.089	0.938
3355	Aluminium rolling and drawing,nec.*		
3535	Conveyors and conveying equipment	.964	1.082
3563	Air and gas compressors*		
3711	Motor vehicles and car bodies*		

*Industry data not reported for New Jersey.

useful lesson here[4]. The key is to stimulate economic development in the designated municipality and to ensure that the benefits of increased employment spill over to its residents. the target should not be any specific neighborhood. Rather, it should be the entire municipality, and therefore, the choice of zones within the municipality should be those areas with the greatest chance of economic success. In some instances the whole municipality itself may be the only viable zone. To leave out economically sound areas may jeopardize the success of the zone.

Two other general principles should also be considered. The single major need of new business is capital financing. This is particularly true of the small businesses which are likely to find enterprise zones attractive. An effective enterprise zone policy should include a venture-capital fund. Capital-formation is the top priority for fledgling businesses and hence becomes the single most appealing incentive that an enterprise zone policy can offer. There are numerous alternatives by which capital assistance can be offered -- loan guarantees, interest subsidization, etc. It is noteworthy that the Connecticut program has a $1 million loan fund available to new and expanding business in the State's six designated zones. However, the best-known federal enterprise zone bill (Kemp-Garcia) does not provide for such direct capital assistance,[5] and there is evidence from Great Britain that the lack of a capital funding provision in the enterprise zone program of that country has reduced the job creating potential of the zones.[6]

Finally, the incentives offered by enterprise zone legislation should not include local property tax abatement, unless the tax losses are fully compensated by additional state aid. Provisions for abatement without full compensation by the State would transfer costs to others within the municipality, with resulting pressure of higher property tax rates or reductions in municipal services. The local government suffers a revenue loss from this abatement, while the tax revenue benefits of any new employment generated accrue primarily to the State (increased sales, personal income and corporate income taxes). New Jersey has a long-standing tax-abatement program (Fox-Lance) and municipalities can choose to offer this incentive; an additional property tax abatement provision would not be useful as part of an enterprise zone package unless fully financed by State aid.

II. Urban Enterprise Zone Legislation

The New Jersey legislature has had before it several urban enterprise zone bills. The Administration bil' A-1617, awaits action in the Ser Revenue, Finance and Appropri Committee.

In addition, a number bil enterprise zone proposa' pending in Congress.

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4. Connecticut has enacted the nation's first enterprise z rea designate has designated zones in six of its cities. The type eature for econo varies but each area includes some potentially attrac mic development.
5. But indirect provisions for encouraging capital gains tax and industria of investment tax credits, elimination of capi ion exist in the for development bond financing.

Times, April 9, 1982.

would likely result in the designation of some enterprise zones in New Jersey. However, federal action on any enterprise zone bill is unlikely in the immediate future and it is important for New Jersey not to delay its own initiative until Congress acts. In fact, all of the federal bills require state and local commitments in order for an area to qualify as a federal enterprise zone. An enterprise zone program which is already in-place would put the State at an advantage. Connecticut, as previously mentioned, has not only enacted its own program, but has proceeded as far as designating six areas as enterprise zones. Moreover, the extent of New Jersey's urban economic problems makes it imperative that the State proceed with its own efforts to assist urban economic growth regardless of whether or not the federal government enacts a national enterprise zone law.

In the following section we examine the provisions of enterprise zone legislation proposed by the Reagan Administration. It is appropriate to consider the national proposal for several reasons. First, it is important to find out if the eligiblity criteria in the national law might pose any special problems for New Jersey. Second, state eligibility criteria should be designed to conform to national criteria; anticipation of the federal rules is necessary if this task is to be expedited. Finally, the incentives offered by the State should complement those in the national law as far as possible, and, of course, this also requires some prior knowledge of the federal proposal.

To satisfy those needs, we shall first outline the incentive provisions of the proposal in Washington. We shall then examine the selection criteria to see where problem areas might exist for New Jersey.

A. Incentives in the Federal Proposal

Federal tax incentives apply to approved zones for a maximum of twenty years plus a four year phase-out period.

1. An investment tax credit, in addition to the existing federal credit, for investment within zones in the amount of 5 percent for personal property and 10 percent for new construction.

2. Extension of the excess credit carryback to three years and carryforward to 15 years or the life of the zone.

3. Continued availability of Industrial Development bonds even if they are disallowed elsewhere.

4. A 5 percent personal income tax credit for wages of employees working in the zone up to a maximum of 1.5 times the Federal Unemployment Tax Act wage base.

5. A tax credit to employers who hire physically, mentally, or economically disadvantaged employees, with the credit equal to 50 percent of wages during their first three years of employment declining by 10 percentage points per year thereafter.

6. A tax credit to new zone employers of 10 percent of total zone payroll; for existing businesses 10 percent of the increase in payroll after zone designation.

The above list includes some strong incentives, as indeed must be the case if enterprise zones are to be effective. Moreover, incentives are provided not only to employers, but to investors and employees as well. They appear to be fairly well balanced between capital and labor and thus should avoid promoting excessive use

of one input relative to the other which could lead to unfortunate cutbacks once the incentives expire. In short, we would expect this list of incentives to be quite effective, especially when associated with a complementary group of state incentives.

Unfortunately, however, there is no new incentive for capital financing, i.e., a provision which would reduce "up front" costs of investing firms. Industrial development bonds are useful of course, but they are already available for firms investing in the State both in and out of prospective enterprise zones. If enterprise zone legislation is to reach its full potential, federal and/or state laws should provide other capital-formation benefits such as loan guarantees and interest subsidies.

While we shall make no attempt here to furnish a list of state incentives, we might at least suggest some general characteristics which we feel should be included in any state enterprise zone program. First, we would enhance the corporate tax relief in the federal proposal, tying part to investment tax credits and the remainder to yearly income tax reductions. Second, we would add to the federal incentives for housing, again using investment tax credits for this purpose but avoiding any property tax abatement which could increase tax rates for non-zone taxpayers. Last, we would provide individual income tax credits and yearly tax reductions (similar to those for corporations) for proprietors and partners in unincorporated businesses. This is needed because no enterprise zone can be completely successful unless it attracts seldom-incorporated small retailers -- pharmacies, barber and beauty shops, boutiques, cafes, delicatessens, etc. -- that are found in viable business districts elsewhere. Last, we would add capital formation benefits to supplement those presently available under federal law.

B. Zone Criteria in the Federal Proposal

To be eligible for enterprise zone status under the national administration's proposal, a prospective zone must have a continuous border encompassing an area of pervasive poverty, employment and general distress as determined by the Secretary of Housing and Urban Development. Then, the zone must satisfy one of the following four criteria:

> (A) The average annual unemployment rate in the zone, as determined by the most recently available data from BLS, must be at least one and one-half times the national average.
>
> (B) The zone must have a poverty rate of 20 percent or more for each census tract.
>
> (C) At least 70 percent of the households living in the zone must have incomes below 80 percent of the median income of households in the local government's jurisdiction.
>
> (D) The population of the zone must have decreased by 20 percent or more between the 1970 and 1980 census determinations.

From the wording of the proposal, an area meeting any one of the four criteria will qualify for nomination as an enterprise zone. However, designation of no more than 75 zones will occur over a three year period and 25 of these must be rural. Thus, it is clear that many areas in cities across the United States will qualify for nomination, but only a few will be actually designated. It is probable that an area would have to meet more

than one of the criteria to be designated a zone. In fact, it seems highly likely that all four criteria will have to be satisfied. It is therefore essential to examine how well the four criteria are met by New Jersey cities.

Though the criteria are apparently directed toward a zone that is smaller than the city, we believe that designating entire cities would be, in many cases, preferable. The reason is that designation of a whole city would permit down-town disticts to be eligible for inclusion in zones. This may be necessary if effectiveness is to be assured; a zone may not prosper if an economically viable adjacent area is excluded by the law's criteria.

Criteria for Six Cities

Table 1 below provides some general information relating to the four criteria for six major New Jersey cities. Our objective is to shed some light on whether or not designation is probable for each of the six under the National Administration's proposal.

Criterion (A) in the federal proposal requires the prospective zone to have an unemployment rate equal to or higher than one and one-half times the national average. Since the national average in 1980 was was 6.6 percent, using census data, a zone would need an unemployment rate of 9.9 percent or higher. If the entire city were to be designated the zone, all of the six New Jersey cities listed in Table 1

Table 1
CRITERIA-RELATED DATA FOR THE STATE AND SIX MAJOR CITIES

	(A) Unemployment Rate (%) 1980	(B) Poverty Rate (%) 1980	(C) Median Household Income ($) 1980	(D) Population Change (%) 1970-1980
Newark	15.4	32.8	10,118	-13.9
Camden	17.9	26.9	8,285	-17.2
Jersey City	9.8	21.2	12,787	-14.2
Elizabeth	15.6	15.8	15,423	-5.7
Paterson	10.6	25.2	11,999	-4.7
Trenton	10.2	21.2	12,182	-12.0
State	6.7	9.5	19,801	2.7

Source: U.S. Department of Commerce, Bureau of the Census
Census of Population and Housing, 1970 and 1980.

would qualify except Jersey City. Should the most effective zone for Jersey City prove to encompass the entire city, the criterion would present a problem. Jersey City could carve out a zone within the city which would meet the criterion, but such an action could jeopardize the zone's success.

Criterion (B) requires a poverty rate of 20 percent or more in each tract. On a city-wide level only Elizabeth fails to meet this criterion; however, the requirement that it be satisfied by each tract would cause difficulty for most cities. In Newark, for example 23 of 97 census tracts fail to meet this criterion. Again, gerrymandering a zone within the city's borders would be possible, though it would be difficult to meet the single continuous boundary requirement and still include worthy tracts.

Criterion (C) cannot be examined for the city as a whole. It is apparently designed for zones which constitute only part of their host cities; 70 percent of households in each zone must have incomes below 80 percent of the median income of households in the city. However, we can see how far median income of each of the six New Jersey cities lies below the state median income. Newark median income, for example, is 51.1 percent of the state median; Camden's median income is even lower at only 46.9 percent of the state level.

Finally, criterion (D) requiring a population loss of 20 percent or more for the zone cannot be met by any of the six major cities. Again, as will be seen when tract data are analyzed later, many tracts do meet the criterion, but many others do not, making it difficult for cities to select suitable zones.

A Closer Examination of Newark and and Jersey City

We now consider more closely two of the six New Jersey cities -- Newark and Jersey City -- to see how well they conform to the federal criteria. The first criterion requires average annual unemployment rates, as determined by the most recently available data from the Bureau of Labor Statistics, to be at least 1.5 times the national average. Since BLS figures are not produced for census tracts, and are unreliable at the city level, because of small sample size, we use the unemployment figures of the 1980 census. We find that Newark as a whole meets the criterion, but Jersey City falls just short.

The Federal proposal also requires that the poverty rate be 20 percent or more in each Census tract. As previously mentioned, the cities in their entirety can meet this requirement, but some tracts cannot. Twenty-three of Newark's 97 tracts fail to meet the criterion, while 29, or 44 percent of Jersey City's 66 tract poverty rates fall short. This criterion could be a crucial problem for cities wishing to designated as zones. Either zones must be gerrymandered within the cities, or they must risk missing designation because of failure to satisfy the all-tract requirement. And we feel that gerrymandering areas can undermine the success of the enterprise zone program. Some already economically viable tracts should be included in enterprise zones if they are to achieve success. Badly depressed areas may be avoided by businesses, employees and patrons, simply because they are badly depressed. Some parts of zones should already appear to be reasonably attractive to firms which might locate or build housing there. Only then can prosperity spill over to adjoining tracts.

The next requirement stipulates that at least 70 percent of households in the zone have incomes below .80 percent of the city's median household income. Again, this requirement cannot be met by an entire city. By definition, only 50 percent have incomes below the city's median income! In addition, an entire city may have virtually no tracts with incomes below 70 percent of the city's median. Only four of Newark's 97 Census tracts meet this strict requirement. In Jersey City, only one of the municipality's 66 tracts can satisfy it.

A perhaps more realistic criterion would change the comparison from city median income to state median household income. If we apply this to Newark, we can find many tracts with less than 70 percent of the State median level; 51 of the city's 97 Census tracts are now in this category. Once more zones may be selected within city boundaries, but we must again point out that this might jeopardize the prospect of success of the zones.

We are also troubled by the requirement that a zone must have lost at least 20 percent of its population between the 1970 and 1980 Census counts. We have already noted that the State's six major cities fall short of this requirement. Camden comes closest to meeting it with a loss 17.2 percent. Elizabeth and Paterson lost only 5.7 and 4.7 percent, respectively. Newark, which lost 13.9 percent experienced losses in excess of 20 percent for only 33 of its 97 tracts. This situation would make it especially difficult to carve zones within cities. Moreover, it is not altogether clear that population loss measures distress in a city. It is possible that some cities that experience only small losses are among those in the greatest distress. In special cases the unemployed may not be able to emigrate easily from a city; thus despite large increases in poverty and unemployment, the population loss will be small. As evidence, there seems to be no clear relationship between poverty, unemployment, and population loss in the figures of Table 1. For example, Trenton had a lower unemployment rate in 1980 (10.2%) than Paterson or Elizabeth (10.6 and 15.6%, respectively) but Trenton had a much larger 1970 to 1980 population loss (12.0%) than either Paterson (4.7%) or Elizabeth (5.7%). Moreover, Paterson's high 1980 poverty rate (25.2%) appeared to contradict its low rate of population decrease (4.7%). Thus, population loss percentage appears to be a poor indicator of distress for the six cities.

The Newark Case in Detail

Figures 1 through 5 are census tract maps for Newark. Numbers of tracts are encircled when the tracts meet the criterion stated in each figure's heading. Figure 3 represents tracts meeting the criterion stipulating 70 percent of households with incomes below 80 percent of city median. Figure 4 replaces "city" with "state."

Figure 1 makes clear the amount of gerrymandering that must be done to carve out a zone meeting the unemployment rate requirement. For example, it may be seen that tracts 82 and 11 which do not meet the criterion are almost entirely surrounded by tracts that do. Moreover, the lower left leg of the map includes four qualifying tracts that are completely separated from the main body of qualified tracts. Specifying a zone with a continuous boundary that would include all qualifying tracts would be impossible; specifying one that would incorporate a logical grouping of tracts would be very difficult indeed.

Figure 2 also shows qualified tracts that are separated from the main grouping. Here 74 of Newark's 97 tracts meet the 20 percent poverty rate requirement. And the dispersion over the entire city lends strength to the argument that the entire city might properly be considered the zone. Any development that would occur in the low-poverty areas would redound to the benefit of workers and residents of the high poverty tracts.

In Figure 3 we see the difficulty that is presented by the income requirement. Only four geographically separated tracts in Newark have sufficient percentages of households with incomes below 80 percent of the city income. Consider this fact: If all households in the city had incomes at the same extremely low level of $3,000, no tract could qualify. The city might be in the direst of straits, yet still be unable to meet the criterion. There seems to be little logic behind this requirement; its purpose is difficult to understand and its calculation is unnecessarily complicated.

One possibility to make the criterion more meaningful would be to compare tract incomes to median state, rather than city, income. Figure 4 illustrates this possibility. Fifty-one tracts would now meet the criterion. However, the problem of delineating a zone would remain difficult; tracts 8, 2 and 3 are isolated from the others satisfying the requirement.

Figure 5 shows the 33 tracts with population losses greater than 20 percent between 1970 and 1980. The problem of creating a zone is now at its worst. Qualifying tracts are separated from others; much zig-zagging would be necessary to cover any group; and important tracts would have to be left out.

To emphasize the problem, there is not one tract that meets all four criteria as they are now given. We expect that cities meeting all four criteria will have the best chance of being designated enterprise zones. Accordingly, we fear that Newark and other deserving New Jersey cities may not be selected.

Criterion C, requiring that at least 70 percent of the households in the zone have incomes below 80 percent of the city median, is the most difficult to satisfy. As previously stated, this criterion can exclude cities which are most deserving but which have fairly uniform income distributions.

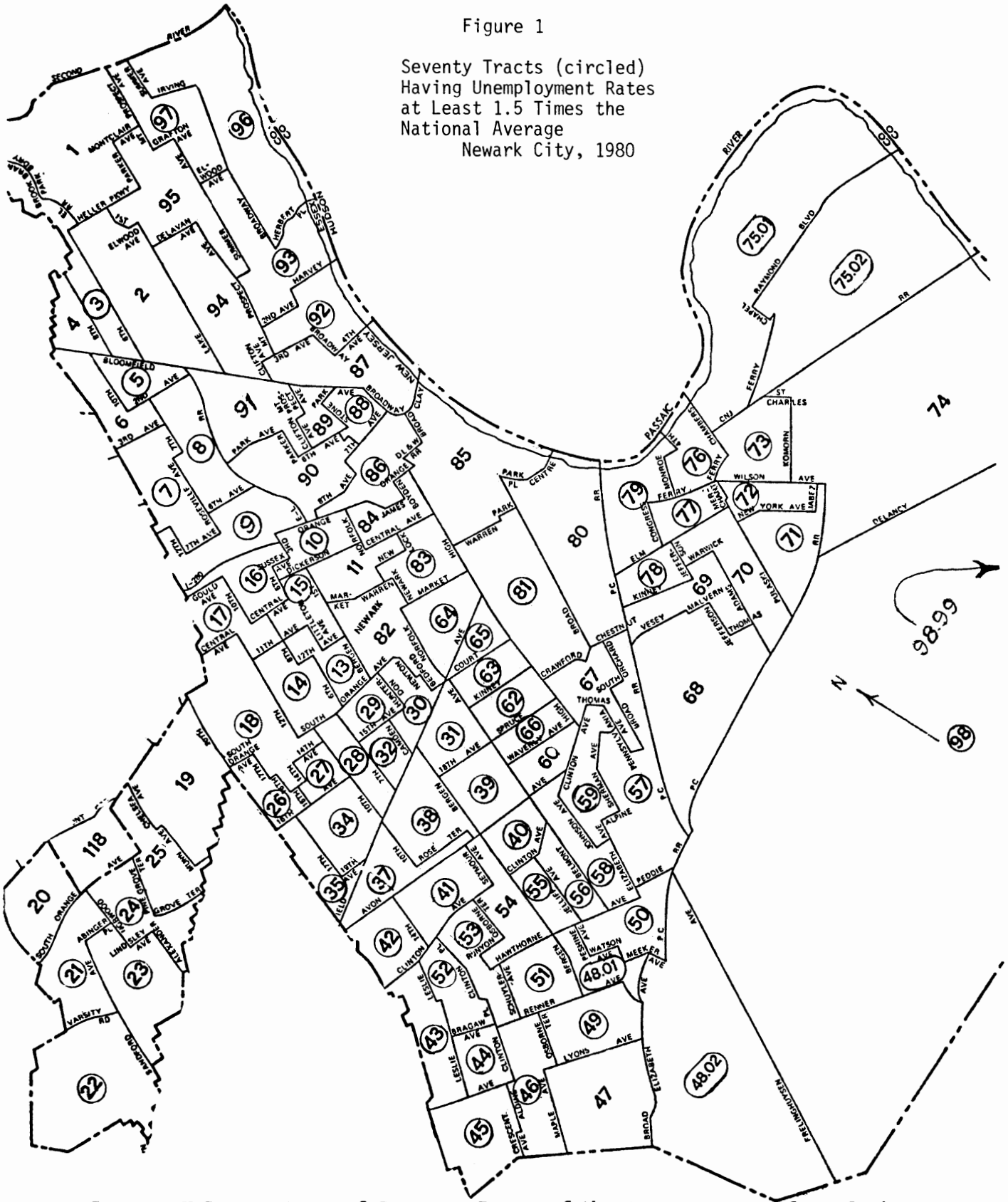
Even if criterion C were changed by replacing the city median income with the state median in its specification, only 19 of the 97 Newark tracts would meet all four criteria. These tracts are shaded in Figure 6. It may be seen that there are not one but four continuously bounded areas, so even with the more lenient specification, a zone cannot be found which meets all of the federal requirements.

Table 2 shows the various combinations of criteria (maximum) which a tract can meet, and the number of Newark tracts which do meet these combinations. The table is a tally of the 97 tracts. Each of the tracts is classified according to the criteria it meets. For example, the entry "3" for AD indicates that three tracts satisfy criterion A and criterion D, no more and no less. Tracts satisfying only one criterion, say A, are classified under A in the table. AD tracts are not ennnumerated under either A or D by themselves.

Again, the problem is quite clear. Newark (and other New Jersey cities) may be passed over in the selection process if the federal criteria are not changed. As specified, criterion

Figure 1

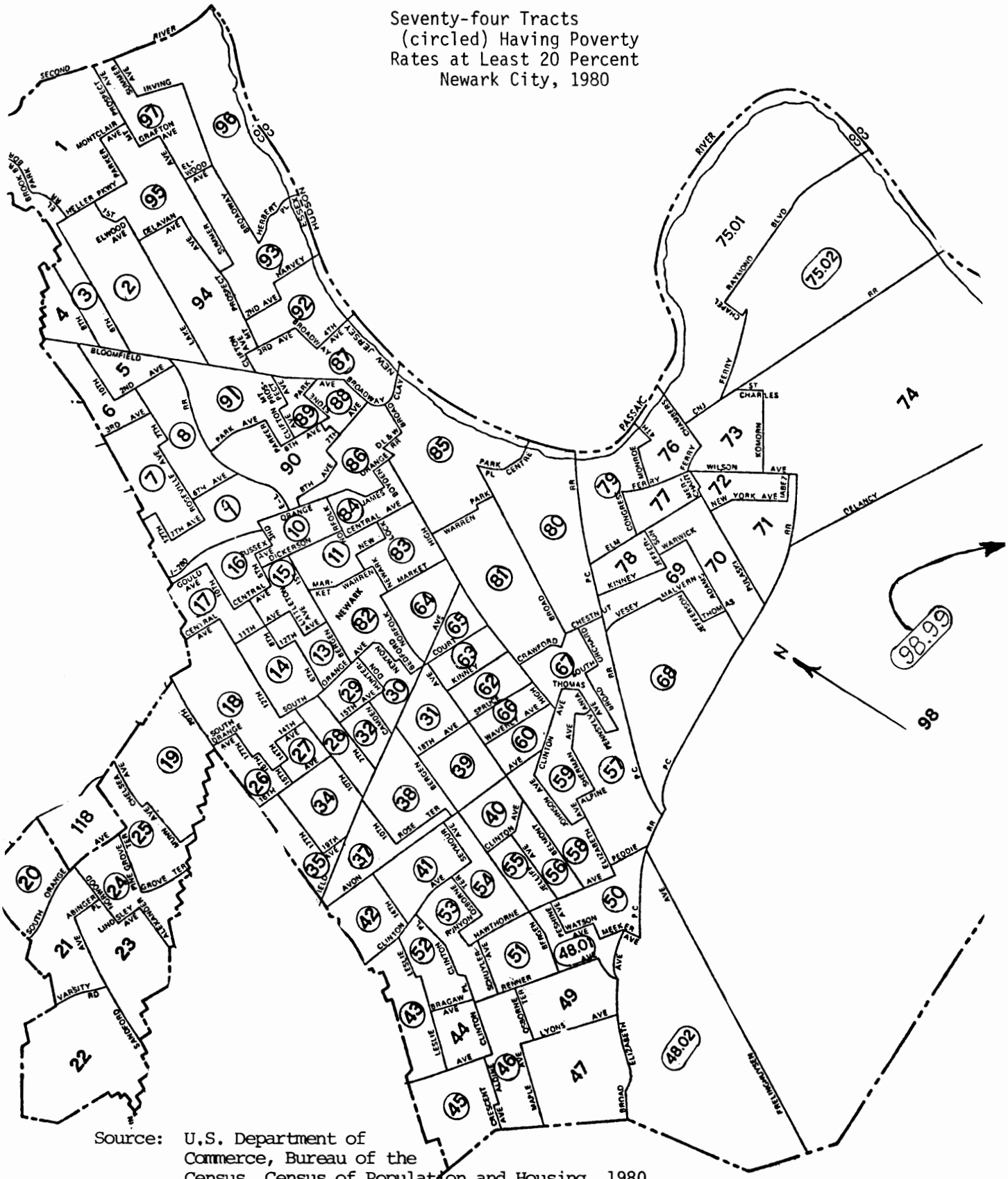
Seventy Tracts (circled) Having Unemployment Rates at Least 1.5 Times the National Average
Newark City, 1980



Source: U.S. Department of Commerce, Bureau of the Census, Census of Population and Housing, 1980.

Figure 2

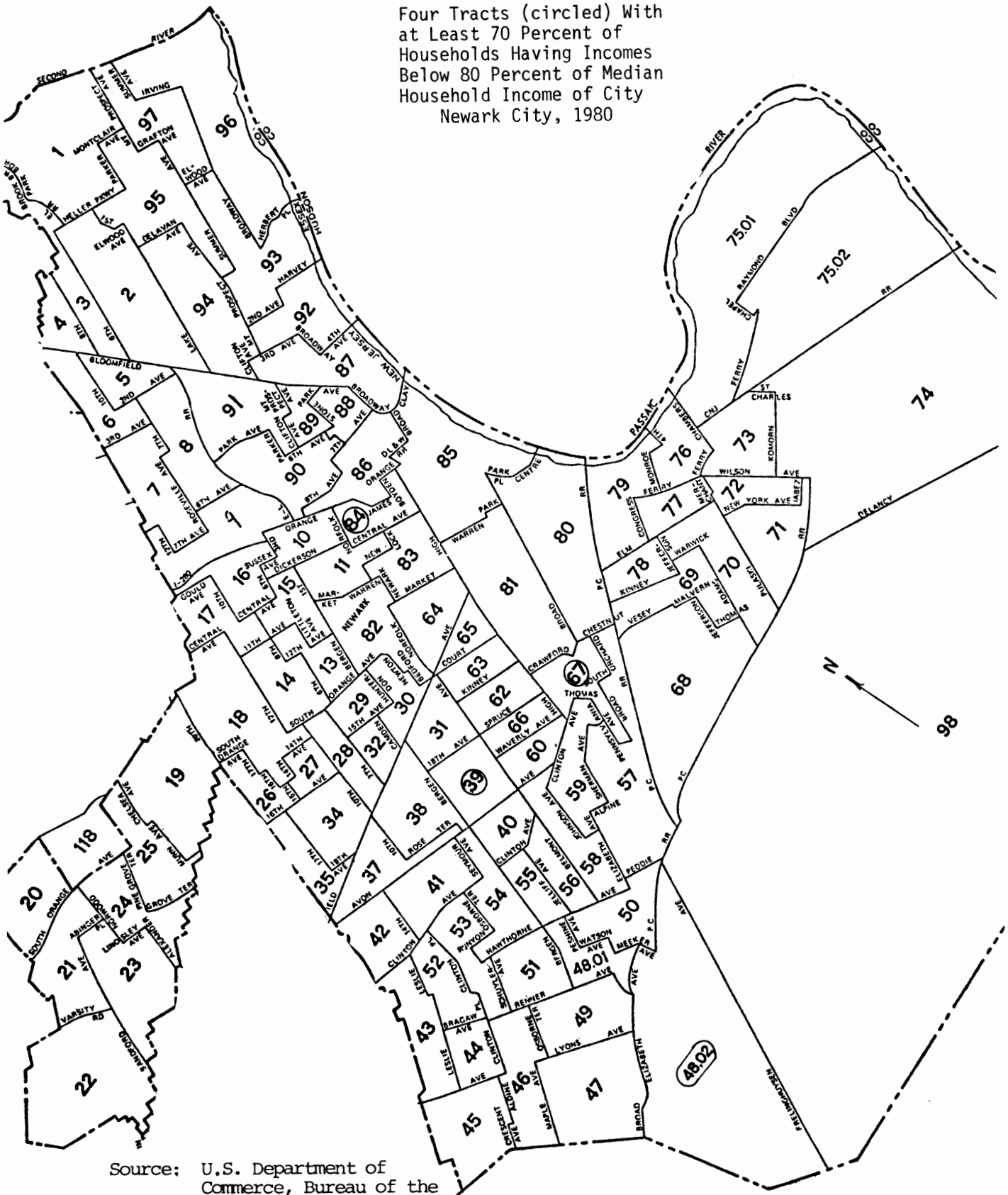
Seventy-four Tracts
(circled) Having Poverty
Rates at Least 20 Percent
Newark City, 1980



Source: U.S. Department of Commerce, Bureau of the Census, Census of Population and Housing, 1980.

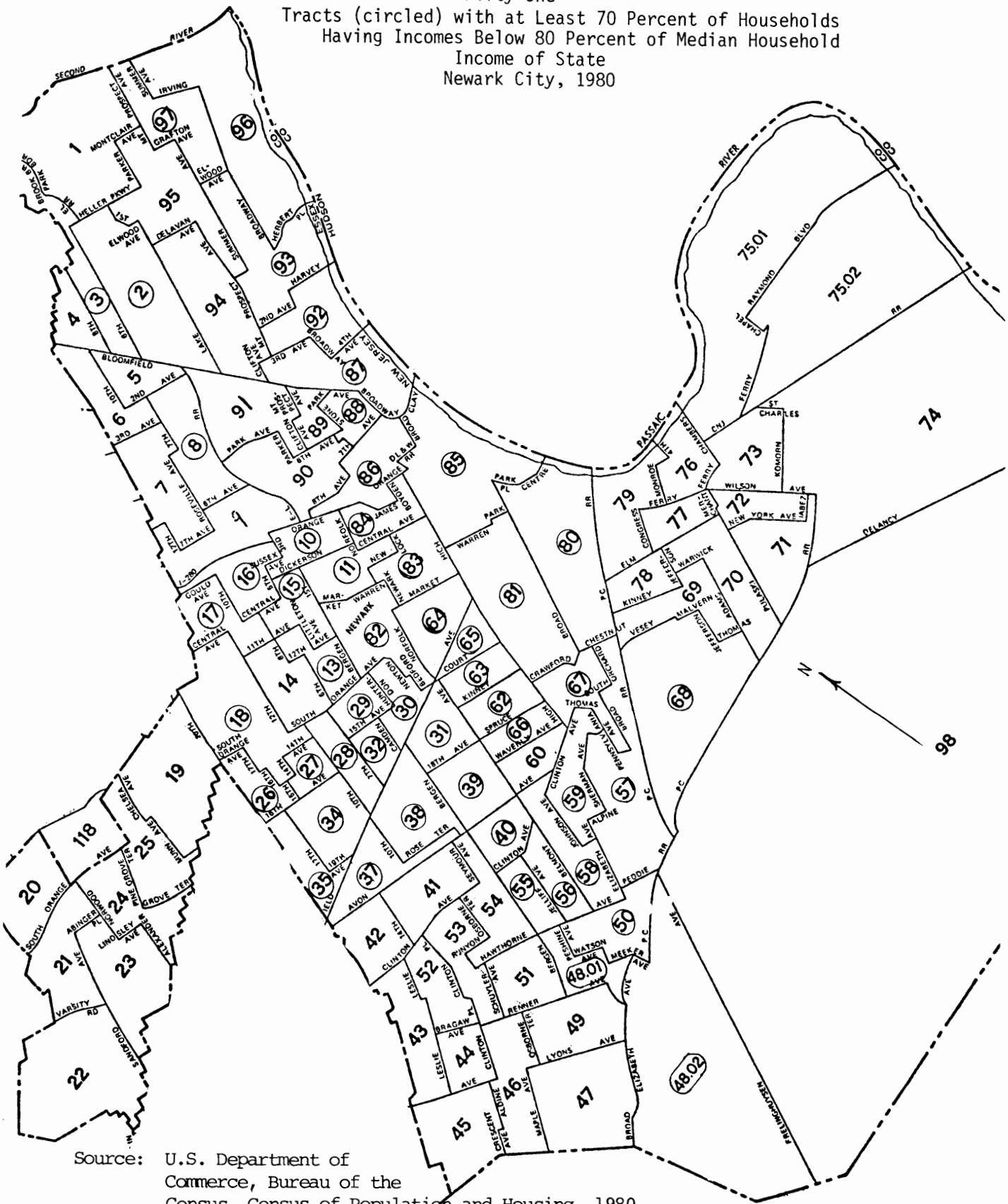
Figure 3

Four Tracts (circled) With at Least 70 Percent of Households Having Incomes Below 80 Percent of Median Household Income of City Newark City, 1980



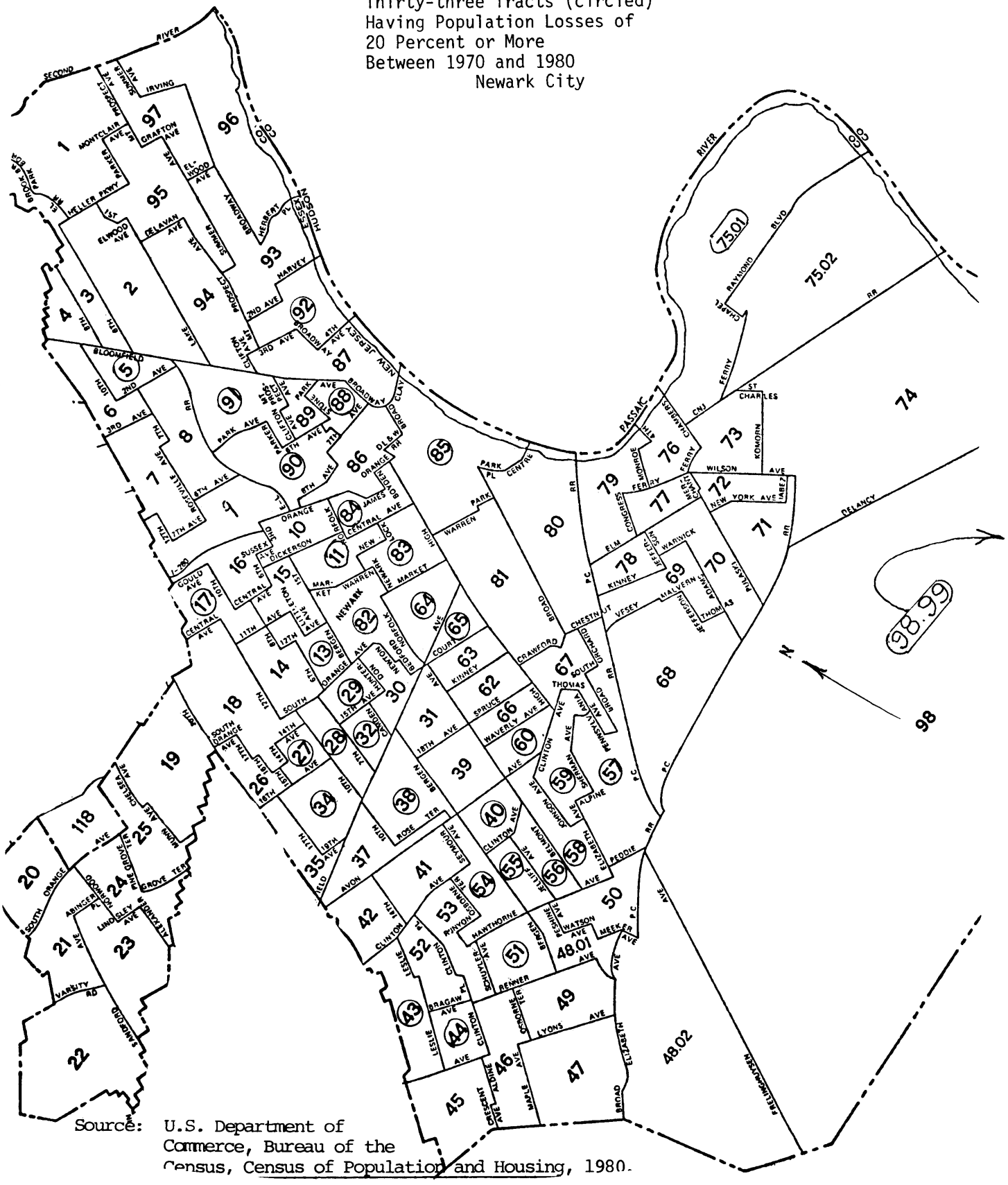
Source: U.S. Department of Commerce, Bureau of the Census, Census of Population and Housing 1980.

Figure 4
Fifty-one
Tracts (circled) with at Least 70 Percent of Households
Having Incomes Below 80 Percent of Median Household
Income of State
Newark City, 1980



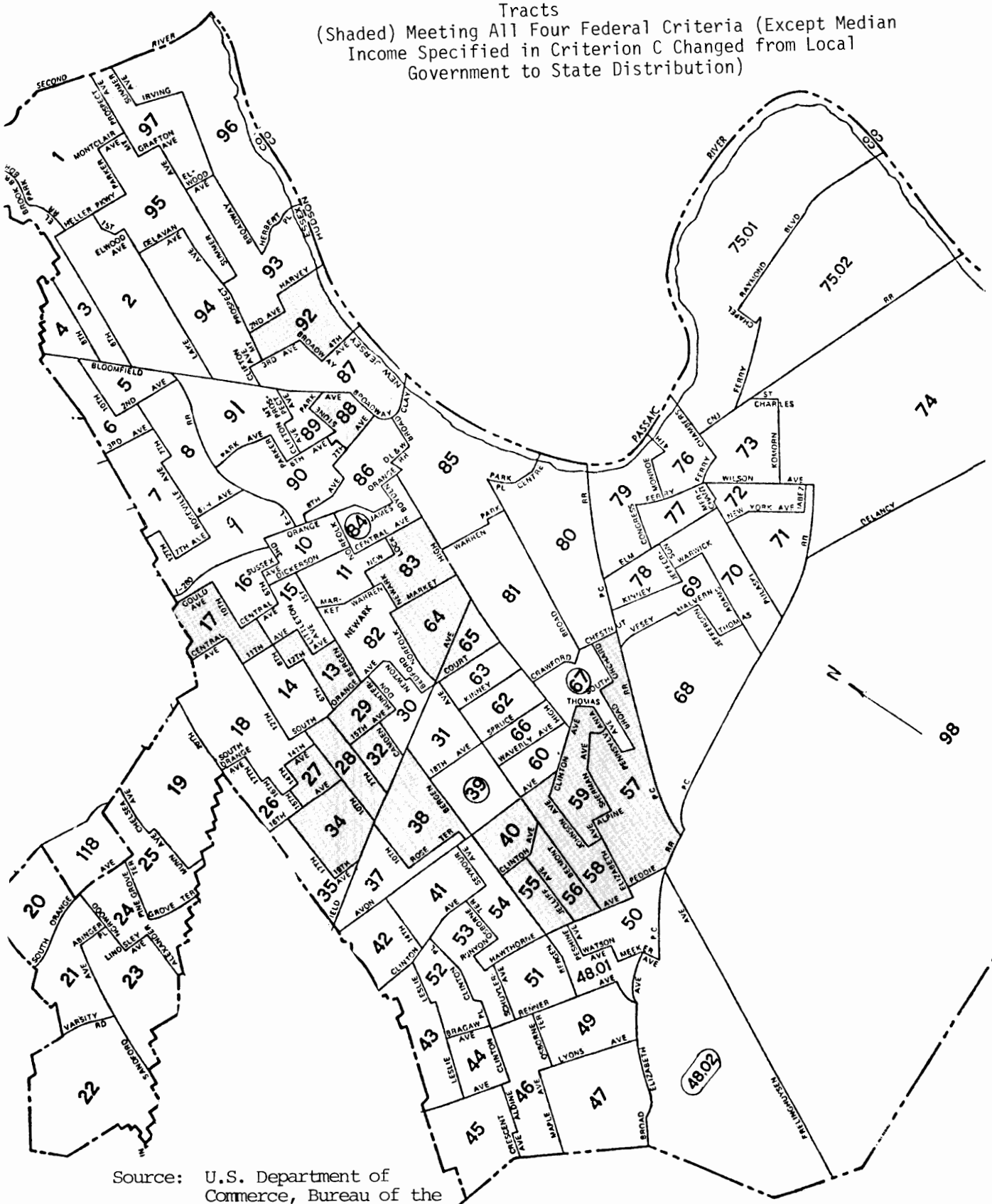
Source: U.S. Department of Commerce, Bureau of the Census, Census of Population and Housing, 1980.

Figure 5
Thirty-three Tracts (circled)
Having Population Losses of
20 Percent or More
Between 1970 and 1980
Newark City



Source: U.S. Department of Commerce, Bureau of the Census, Census of Population and Housing, 1980.

Figure 6
Tracts
(Shaded) Meeting All Four Federal Criteria (Except Median Income Specified in Criterion C Changed from Local Government to State Distribution)



Source: U.S. Department of Commerce, Bureau of the Census, Census of Population and Housing, 1980.

Table 2
NUMBER OF CENSUS TRACTS MEETING FEDERAL CRITERIA COMBINATIONS*
Newark City (97 Total Census Tracts)

Criteria Combination	Number of Tracts Satisfying Combination	Criteria Combination	Number of Tracts Satisfying Combination
ABCD	0	BC	2
ABC	2	BD	7
ABD	20	CD	0
ACD	0	A	11
BCD	0	B	8
AB	34	C	0
AC	0	D	2
AD	3	None	8

*This table fully describes criteria met by 97 census tracts. For example, there are precisely 20 tracts which satisfy criteria A, B and D only. Only two tracts satisfy A, B and C only and no tracts satisfy only C. (A number of tracts satisfy criterion C but only in combination with other criteria.)

C can be satisfied by only four of the Newark tracts. Moreover, the population requirement is difficult to meet and it is not necessarily an indicator of needs. As previously noted, if cities receive preference when they can meet all four criteria, New Jersey's cities will be placed at a distinct disadvantage.

III. Summary and Conclusions

New Jersey's urban policy must address a number of formidable problems faced by the cities. Urban enterprise zones cannot remedy all of the ills of the cities. They can, however, provide a useful adjunct to a comprehensive and effective urban policy.

The Federal Administration's enterprise zone proposal is of interest to the State for two reasons. First, the State must plan its own enterprise zone legislation, and New Jersey's plan should complement the federal legislation. Second, the State will be competing with other states for zone designation, and it is important for New Jersey to see that the federal requirements do not eliminate the State's cities from the competition.

The federal proposal contains attractive tax incentives that are well-balanced between capital and

labor. New Jersey's legislation should contain similar provisions, but avoid property tax abatement which can work against urban policy by creating incentives for firms and population to leave, not enter, the cities. Federal and/or State provisions should be extended to include capital-formation incentives such as guaranteed or low-cost loans. Positive incentives should be offered to corporations as well as partnerships and single proprietorships to provide a balance between small businesses and larger employers.

An examination of how well New Jersey cities meet the federal requirements uncovers several problems. It appears that the requirements visualize zones which lie within their host cities and cover only part of the cities' territories. In many instances it may be more effective to nominate the entire city as a zone to guarantee that some already viable districts will be included. One criterion (household income) would preclude such a possibility; the others would make difficult, if not impossible, the selection of a zone having a continuous boundary within city boundaries.

IV. Recommendations

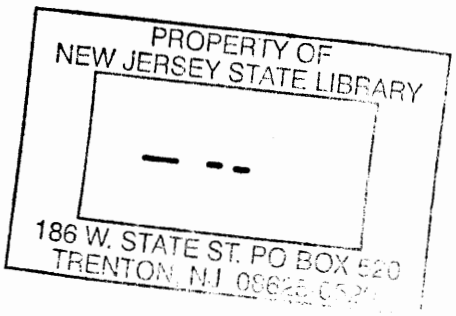
Based on our findings for six New Jersey cities, we would suggest several changes for the federal law:

1. No comparison of zone and city statistics should be required. This would make it possible to nominate entire cities as zones.

2. The population loss criterion should be eased greatly, or dropped altogether, since it appears to be a poor measures of distress.

3. The poverty rate criterion should be applied to the total zone, not to each tract.

Some provision should be added to minimize the incentive for businesses located near the zones to move into the zone and leave empty buildings behind them. For example, new zone firms (or firms expanding within the zone) could be required to certify that they have not abandoned, or do not intend to abandon, facilities within a given distance from the zone boundaries.



III

ESTIMATION OF THE COUNTER-CYCLICAL EFFECT OF MORTGAGE INTEREST SUBSIDIES*

I. Introduction

During the late 1960's and 1970's mortgage interest subsidy programs at the federal, as well as the state, level have rapidly increased and have been used not only to make housing more affordable, but also to smooth out cyclical fluctuations in housing construction. Accordingly, mortgage interest subsidy programs may be analyzed either in terms of their distributional effects, or in terms of their ability to stimulate additional housing sales and starts.[1]

In this paper, we analyze the countercyclical effect of interest subsidy programs of the state housing finance agencies. While there have been extensive studies of the subsidy programs of the federal agencies[2] and although the state subsidy programs work similarly to those of the federal agencies, there has been no attempt to evaluate the countercyclical effect of the state programs. It is hoped that the findings of this study will be useful for state housing policy formulation.

State housing finance agencies in the U.S. have emerged in the 1970's as an important financing source for housing. According to Betnun (1976), the New Jersey Housing Finance Agency during the period 1970-1976 accounted for nearly 15 percent of all private multi-family housing starts in New Jersey. In addition, the New Jersey Mortgage Finance Agency has financed over 35,000 owner-occupied housing units and about 5,000 home improvement loans during the 11-year period ending in the 1982 fiscal year.[3] However, it is not clear whether there would have been 15 percent fewer multi-family housing starts and 35,000 fewer owner-occupied housing sales in the absence of subsidies.

As will be shown below, unless the subsidies can suppress the mortgage interest rate permanently below the market rate, any temporary increases in housing demand generated by interest subsidies will be offset by later decreases, assuming interest rates fall later to the subsidized rate or below. However, there appears to be a consensus that interest subsi-

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* Prepared by Jong Keun You and Laurence H. Falk. We thank Constance Gibson of the Mortgage Finance Agency and Gerald Trimble of the Department of Banking for providing us with valuable information.

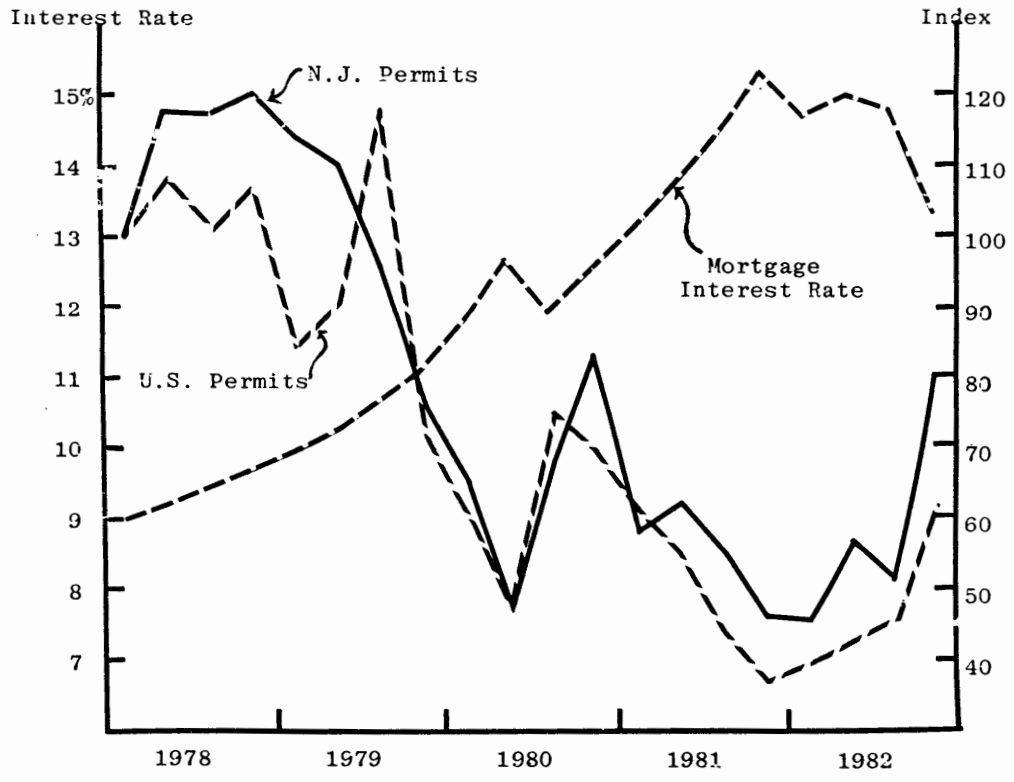
1. For a study dealing with the distributional effects, see von Furstenberg (1976). Comprehensive reviews of housing market are Tuccillo, Van Order and Villani (1982) and Fredland and Macrae (1978).
2. See, for example, von Furstenberg (1976), Hendershott (1980), Jaffee and Rosen (1978), Swan (1973) and Utt (1977).
3. See Annual Report, New Jersey Mortgage Finance Agency, Newark, 1982.

dies do have a significant short-run effect on housing starts and, hence, can be used as a countercyclical policy measure.[4]

The countercyclical aspect of the interest subsidy programs has received a great deal of attention during the 1981-82 recession, particularly because of the prolonged depression of the housing market in response to sustained high mortgage interest rates. Figure 1 shows recent trends in mortgage interest rates and single-family housing permits both for New Jersey and the U.S. Rapidly rising interest rates during the four-year period of 1977:IV to 1981:IV forced the national and New Jersey housing market into one of the worst slumps since the great depression. U.S. housing permits plummeted by 69 percent from 1979:III to 1981:IV, while in New Jersey the decline was 63 percent from 1978:IV to 1982:I. Recent declines in the mortgage interest rate have revived the housing market somewhat. However, it would be useful to develop a method of evaluating countercyclical policies aimed at stimulating housing sales.

Section II analyzes the mechanism of these subsidy programs, and in the following section we construct and estimate an econometric model of housing demand. In section IV the estimated demand equation is compared to

Figure 1
Recent Trends in the Interest Rate and Housing Permits:
(Permits; N.J. vs. U.S., Index = 100 for 1978:I)



4. See, for example, Jaffee and Rosen (1978) and the Comptroller General's Report to the Congress (1978).

various levels of the supply of subsidy and the net effect of the interest subsidy is estimated. Section V summarizes the findings and draws conclusions for the study.

II. Supply of Mortgage Subsidies

The State of New Jersey has two agencies dealing with subsidized financing of housing. The New Jersey Housing Finance Agency (HFA) finances multifamily (five or more dwelling units) housing, while the New Jersey Mortgage Finance Agency (MFA) assists financing of owner-occupied (one to four dwelling units) housing. Our analysis in this paper deals with countercyclical effects of MFA subsidies on single-family housing sales.

MFA can provide mortgages at below-market interest rates using funds obtained by issuing tax-exempt securities or funds from federal and, occasionally, state subsidies. In terms of their countercyclical effect on housing starts, these state subsidies are similar to GNMA's (Government National Mortgage Association, popularly known as Ginny Mae) tandem plan since in both cases government outlays cover the present value of the interest subsidy.

Let us first consider the case of state government appropriation. As an example, let us assume that the state government appropriated $25 million in order to provide subsidized mortgages. The state's housing finance agency would effect the subsidy program by buying mortgages at below-market interest rates and, afterwards, selling the mortgages to the private market at a price sufficiently below par to give a normal rate of return to investors. Or, if the State were to use another procedure, we assume the cost would be the same, i.e., equal to the difference between mortgage purchase and sale price under such a buy-sell arrangement.[5]

Table 1 shows the monthly payments (exclusive of property taxes) that home buyers would have to make for various 25-year mortgages and interest rates.[6] Three mortgage levels have been chosen for our illustrations:

1. A $72,000 mortgage on a typically-priced $90,000 new house;
2. A $56,800 mortgage on a $71,000 house representing the federal government's upper limit on the existing New Jersey program;
3. A $48,000 mortgage for a minimal $60,000 new house.

Interest rates are varied from 16 percent downward to 10 percent.

First, if we move down each column, we observe the monthly payment reductions that would follow from interest reductions. Here the house price remains constant, and significantly lower monthly payments follow interest reductions. Second, we may observe something that is particularly relevant to our analysis -- if interest rates are lower, individuals may purchase larger and more expensive houses. For example, an individual may be constrained by his income to payments (abstracting from property

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5. The results of this study could be applied to an analysis of buy-down plans, in which the mortgage interest rate is reduced during the initial years and raised in later years, and to an evaluation of relocation subsidies aimed at attracting new businesses and new residents into the State in order to stimulate long-term growth of the State's economy.
6. Methods used for calculating figures in this and following tables are given in Appendix I.

Table 1
MONTHLY PAYMENTS FOR VARIOUS 25-YEAR MORTGAGES AND VARIOUS INTEREST RATES

Interest Rate	$72,000 ($90,000 House, 20% Down)	$56,800 ($71,000 House, 20% Down)	$48,000 ($60,000 House, 20% Down)
16%	$978.40	$771.85	$652.27
15	922.20	727.51	614.80
14	866.71	683.74	577.81
13	812.04	640.61	541.36
12	758.32	598.23	505.55
11	705.68	556.70	470.45
10	654.26	516.14	436.18

tax) of around $650 per month.[7] With the recent high interest rate of about 16 percent, he could have only purchased a $60,000 house (with 20 percent down). With a 13 percent interest rate, his $650 limit would allow him to buy a $71,000 home (20 percent down). Thus, giving an interest subsidy to a prospective home-owner need not result in an additional housing sales. Some prospects will simply buy bigger homes than they would buy in the absence of the subsidy. The net effect of subsidies on housing sales corrected for this phenomenon will be estimated later.

Table 2, derived from Table 1, gives the monthly payment savings that result from interest subsidies, assuming that the current interest rate is 16 percent and that the subsidies do not cause recipients to purchase more expensive homes. Sizable savings are shown when the interest rate is reduced by several percentage points.

Table 2
REDUCTION IN MONTHLY PAYMENTS RESULTING FROM INTEREST SUBSIDY BELOW THE 16% MARKET RATE

Subsidized Rate	$72,000 Mortgage	$56,800 Mortgage	$48,000 Mortgage
15%	$56.20	$44.34	$37.47
14	111.69	88.11	74.46
13	166.36	131.24	110.91
12	220.08	173.62	146.72
11	272.72	215.15	181.82
10	324.14	255.71	216.09

7. Property taxes averaged about $2.54 per $100 of equalized valuation in 1980. Thus, average total payments for Table 1 would be plus about $190 per month for the $90,000 house, $150 for the $71,000 house, and $127 for the $60,000 house.

But, of course, under a subsidy program, any savings to the home buyer results in an offsetting cost to the state. If the benefit to the buyer is large, the cost to the state is also large.

We can produce a "subsidy supply schedule" by determining how many houses could be subsidized by the state given various subsidized interest rates. The greater the subsidy (the lower the interest rate), the greater the cost to the state and the fewer the number of houses that can be subsidized at a total cost of $25 million.

Table 3 gives the number of houses that can be subsidized given various interest rates and mortgage levels. At 13 percent interest rate (a subsidy of three percentage points), 2,042 houses with $72,000 mortgages; 2,589 houses with $56,800 mortgages; or 3,063 houses with $48,000 mortgages could be handled for $25 million. A type of "supply schedule" can be seen by looking at a single column. Assuming, for instance, that subsidies are to be confined to $90,000 houses ($72,000 mortgages), we see that only 1,048 houses could be subsidized at 10 percent net interest (6 percentage point subsidy). The number increases as the interest rate becomes higher (the subsidy becomes smaller) until, at 15 percent, 6,045 houses could be subsidized. Or, if the state chose instead to limit the subsidies to the smaller $48,000 mortgages, it could subsidize more homes at any subsidized interest rate -- 1,572 at 10 percent or 9,067 at 15 percent. The right-most column represents a subsidy program aimed at a mixture of small low-priced houses, moderately-priced houses and the typically higher-priced new housing being sold in the New Jersey market (average price about $73,700).

For a more widely used tax-exempt bond financing, the supply of subsidy is determined simply by dividing the total value of bond sales by the average value of mortgages. For example, $200 million could finance 2,778 houses with $72,000 mortgages, 3,521 houses with $56,800 mortgages, and 4,167 houses with $48,000 mortgages. The subsidized rate of interest would be determined by the market rate on the tax-exempt bonds plus a small premium to cover administrative costs. However, the federal income tax exemption on this type of bond is scheduled to be phased out by the end of 1983, according to a recent revision in the federal tax law. The phase-out

Table 3
NUMBER OF HOUSES THAT CAN BE SUBSIDIZED BY $25 MILLION AT VARIOUS INTEREST RATE SUBSIDIES (25-YEAR MORTGAGE)

Subsidized Interest Rate	For $72,000 Mortgage	For $56,800 Mortgage	For $48,000 Mortgage	Estimated Supply For Average of Three Mortgages
15%	6,045	7,662	9,067	7,591
14	3,042	3,856	4,562	3,820
13	2,042	2,589	3,063	2,565
12	1,544	1,957	2,315	1,939
11	1,246	1,579	1,869	1,565
10	1,048	1,329	1,572	1,316

would effectively terminate the bond financed subsidy programs, leaving the state or federal government appropriations as the only means of subsidizing home mortgages. For this reason, we shall use state government appropriation for illustration in this paper.

III. Housing Demand

While previously we estimated how many units of housing the state could subsidize at particular interest subsidy, price and mortgage levels, we now want to find out what the response of homebuyers will be, given particular subsidies. In other words, we wish to determine the so-called interest elasticity of housing demand -- the response of housing demand to a change in the mortgage interest rate. In analyzing the demand for housing, we will consider the single-family new home sales rather than housing starts, since housing starts are determined by the rate of sales. The model to be estimated is represented by the following equation:[8]

$$(1)\quad s_t = ma(1-gn_t) + mbI^*_t + mcD^*_t + mdP^*_t + meU^*_t + mfY^*_t + (1-m)n_t s_{t-1}$$

where $I^*_t = I_t - gn_t I_{t-1}$,

$P^*_t = P_t - gn_t P_{t-1}$, etc.,

subscript t stands for time (in quarters), a, b, c, d, e, f, g, and m are parameters. Other symbols in equation (1) are defined as follows:

s = per-capita sales of single family new houses,

$n_t = N_{t-1}/N_t$, where N_t stands for population in the middle month of quarter t,

I = mortgage interest rate,

D = measure of financial disintermediation,

P = relative price of single-family new houses,

U = unemployment rate,

Y = per-capita real disposable income.

Parameter m represents the (quarterly) speed of adjustment of the actual housing stock toward the desired level of housing stock given the market conditions, and parameter g is defined as one minus the (quarterly) depreciation rate of single-family houses.

Figure 2 illustrates the properties of equation (1) when all other variables (including population) are held constant and the interest rate is changed either temporarily or permanently. For a permanent reduction in the interest rate, there is a permanent increase in desired housing stock. In order to bring the actual stock toward the desired level, home sales increase. As the actual stock increases, the gap between the desired and actual stock narrows and home sales decrease slowly to the long-run equilibrium level, which is the initial level plus the level just enough to replace depreciation and maintain the new (higher) desired stock. If, however, the interest rate reduction is temporary and the rate goes up to the original level after, say, one quarter, then households will realize that their desired stock remains at the original level and the actual stock exceeds the desired level due to overshooting during the first quarter. Consequently, home sales will decline below the initial level. Thus, temporary reductions in the mortgage interest rate result in temporary increases in housing sales (and, hence, starts) but eventually these increases are offset by future decreases.

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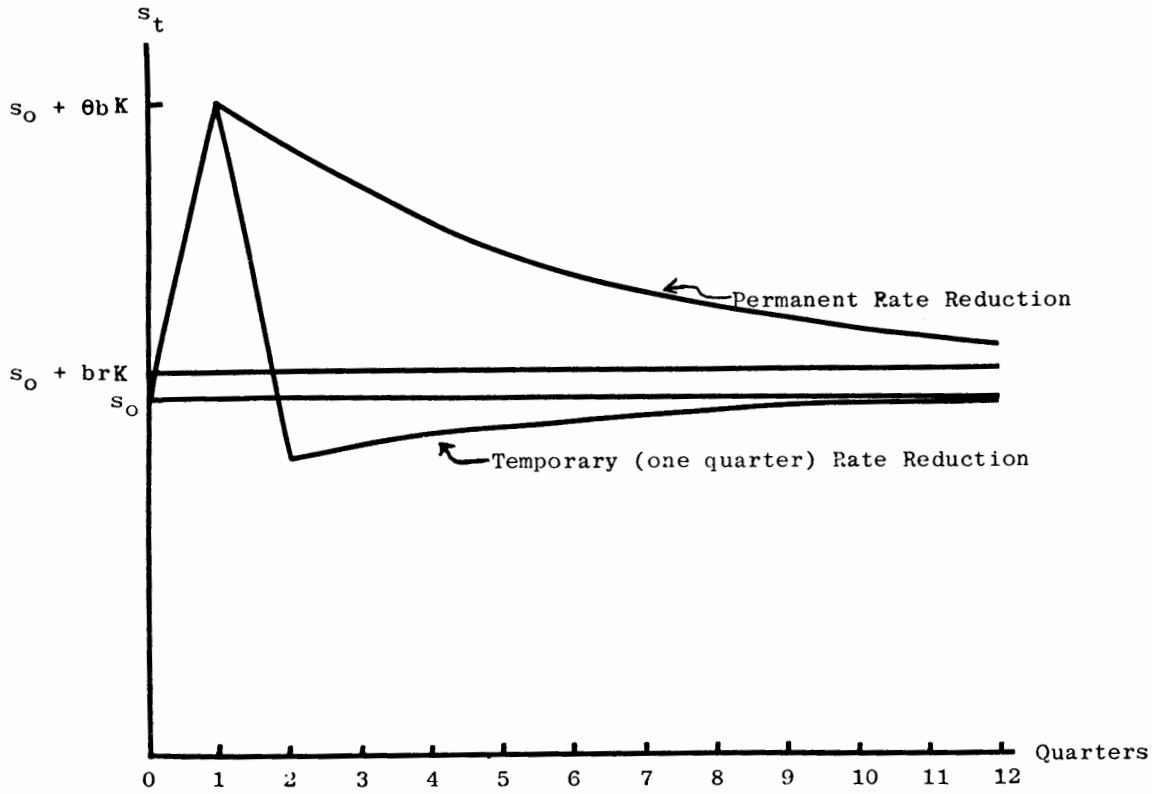
8. Mathematical derivation of the model and its properties are given in Appendix II.

Figure 2
Reactions of Housing Sales to Interest Rate Reductions



Since the housing sales data for states are not available, per capita sales using national data are estimated. Adjusting the estimated per capita sales by the state population will yield the state's total single-family home sales.[9] The disintermediation variable, D, is defined as the difference between the 3-month treasury-bill rate and the regulation-Q rate on the passbook savings account up to and including the first quarter of 1978 (a period in which disintermediation was a factor) and zero thereafter.[10] On the basis of experiments, D was set equal to zero when the treasury-bill rate fell below the regulation-Q rate prior to the second quarter of 1978.

The sample covers a period from 1968:I to 1981:IV (total 56 quarters). The data used for estimating equation (1) were obtained from Chase Econometrics data base with the exception of the regulation-Q rate, which was supplied to us by the New Jersey Department of Banking. The original sources of Chase Econometrics data base are Bureau of Labor Statistics,

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9. States may not have identical intercepts in their housing sales equations. Therefore, an intercept adjustment is necessary for a reasonable estimation of state housing sales.
10. Experiments indicate that the effect of disintermediation may have been substantially weakened since the introduction of money market certificates in the second quarter of 1978.

U.S. Department of Labor, Bureau of Economic Analysis and Bureau of the Census, U.S. Department of Commerce, Federal Home Loan Bank Board, U.S. Department of the Treasury, and Federal Reserve Board.

Table 4
ESTIMATES OF HOUSING DEMAND EQUATION

Parameter	Variant 1	Variant 2	Variant 3	Variant 4
a	194.677 (1.7734)	212.062 (1.5736)	188.265 (1.8044)	204.604 (1.6059)
b	-0.5629 (-2.5413)	-0.7165 (-2.4687)	-0.5612 (-2.5976)	-0.7120 (-2.5303)
c	-0.1796 (-1.9497)	-0.1974 (-1.7291)	-0.1775 (-1.9838)	-0.1947 (-1.7621)
d	3.1587 (1.4060)	NI	3.1156 (1.4223)	NI
e	-0.2790 (-2.7889)	-0.3002 (-2.4735)	-0.2856 (-2.9541)	-0.3077 (-2.6218)
f	0.0177 (0.3441)	0.0212 (0.3401)	NI	NI
g	0.9985 (424.48)	0.9985 (377.12)	0.9983 (417.96)	0.9983 (370.43)
m	0.1923 (2.9970)	0.1604 (2.6773)	0.1948 (3.0906)	0.1629 (2.7721)
R^2	0.9037	0.9001	0.9034	0.8999
DW	2.026	2.050	2.037	2.062
SER	0.0488	0.0492	0.0483	0.0487
F (d.f.)	62.98 (7,47)	72.11 (6,48)	74.81 (6,48)	88.07 (5,49)

Note: Figures in the parentheses are t-statistics and the sample mean of the dependent variable is 0.7068.
DW stands for the Durbin-Watson statistic and SER for the standard error of the regression.
NI stands for "variable not included."

Since equation (1) is nonlinear in parameters, nonlinear least squares technique is used. The estimation results for four different variants of equation (1) are presented in Table 4. Variant 1 includes all variables of equation (1), variant 2 excludes relative price of housing, 3 excludes per capita real disposable income, and 4 excludes both the relative price and income variables. The results are reasonably good and the estimates appear to be robust in the sense that they are not sensitive to specifications. The estimates of b, the effect of mortgage interest rate on new single-family home sales, which is our primary concern in this study, are highly significant. In addition, the effect of disintermediation (c) and cyclical effect of unemployment rate (e) are also significant at the 10 percent and 5 percent levels, respectively. However, the estimated coefficients of per-capita real disposable income (f) are insignificant whether or not the unemployment rate is included. The estimated coefficients for the relative price of single-family new homes (d) have the wrong sign but they are not statistically significant. The perverse sign may be due to the fact that higher relative price may be an indicator of investment value of houses.

The estimates of the quarterly depreciation rate (1-g) are 0.0015 to 0.0017 and not statistically significantly different from zero, reflecting the long-lasting nature of housing stock. The estimated speed of adjustment (m) falls between 0.16 and 0.19, implying a long distributed lag adjustment in response to changes in desired level of housing stock. The long-run effect of changes in the interest rate on the per-capita new single-family home sales, br, shows some variations between the estimates, ranging from -0.0008 to -0.0012. However, the short-run effects, which are relevant to the analysis of interest subsidy effects, show much less variation between the estimates as shown in Table 5.

Table 5
CHANGES IN NEW SINGLE-FAMILY HOME SALES
PER ONE PERCENTAGE POINT REDUCTION IN THE INTEREST RATE

Quarter	Equation 1	Equation 2	Equation 3	Equation 4	Average
1	0.1082	0.1149	0.1094	0.1160	0.112
2	0.0876	0.0967	0.0882	0.0973	0.092
3	0.0709	0.0813	0.0712	0.0816	0.076
4	0.0574	0.0685	0.0575	0.0685	0.063
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
Long-Run	0.0008	0.0011	0.0010	0.0012	0.001

Note: Figures represent units per 1,000 persons.

IV. Net Effects of Interest Rate Subsidies

We now use the above estimates of housing sales response to interest rate changes as shown in Table 5 and the supply of mortgage subsidy schedule as shown in Table 3 to estimate the net effects of mortgage interest subsidies on new single-family home sales.[11] In order to estimate the net effects, however, it is necessary to estimate first the total single-family new home sales in the absence of subsidies and additional demand for new single-family homes that would result from interest subsidies. Since housing sales data at the state level are not available, we estimate New Jersey's single-family new house sales using the following method.

At the national level, new single-family home sales during the first eight months of 1982 (a period of high mortgage interest rates) averaged 92,750 units at the seasonally adjusted quarterly sales rate. During the same period, building permits for new single-family dwelling units in New Jersey accounted for 1.8 percent of the national total.[12] Applying this share to the national sales data yields 1,670 units of sales per quarter in New Jersey, which appears to be a reasonable estimate when compared to regional housing start data and unofficial estimates of New Jersey's single-family housing starts by Chase Econometrics.

Assuming all other variables remain constant and the market rate of mortgage interest remained at 16 percent, a subsidy of the mortgage interest rate by one percentage point will increase the demand for new single family houses by 0.112 units per 1,000 persons in the first quarter, 0.092 units in the second quarter, etc. (see Table 5). Multiplying these figures by New Jersey's population (7,350 thousands) yields 823 units in the first quarter, 676 units in the second quarter, etc. as shown in Table 6. However, those who would have purchased new houses at the existing interest rate (16%) would also like to obtain subsidized mortgages. Therefore, those who are induced into the housing market by the subsidy are joined by those who are already in the market, creating total demand of 823 + 1,670 = 2,493 units in the first quarter, 676 + 1670 = 2,346 units in the second quarter, and so on.

When the supply of subsidized mortgages equals or exceeds the total demand, all of the new, as well as the existing, demand can be satisfied. On the other hand, if the supply falls short of the total demand, some form of rationing would take place. The most plausible rationing would be first-come first-served basis, which is for all practical purposes a random allocation of subsidies. The resulting distribution of subsidized mortgages between the two groups representing additional demand and existing demand would be more or less proportional to the distribution of the demand between these two groups.[13]

Table 6 illustrates how the net effect of a subsidy by one percentage

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11. The analysis of the net effect of tax-exempt bond financing of subsidies will be similar to the example given in this section.
12. This figure may seem low, but it is explained by a slow rate of population growth in the State.
13. The method of proportional allocation between the additional and existing demand is similar to the analytical model of von Furstenberg. However, von Furstenberg erroneously treated the subsidies as a factor shifting the demand schedule rather than one that causes a movement along the schedule.

Table 6
ESTIMATION OF THE NET EFFECT OF NEW JERSEY'S SINGLE-FAMILY HOME SALES WHEN THE INTEREST SUBSIDY IS ONE PERCENTAGE POINT

Quarter	Additional Demand	Total Demand	Supply of Subsidized Mortgages	Additional Demand Satisfied
1	823	2,493	7,591	823
2	676	2,346	5,098	676
3	558	2,228	2,752	558
4	463	2,133	524	114

point (rate reduction from 16% to 15%) can be estimated. In the first quarter, additional demand is 823 units and total demand 2,493 units. The supply of subsidized mortgages (assuming a $25 million appropriation) is 7,591 (see Table 3). Since total demand for mortgages does not exceed the supply of subsidies, all of the new and existing demand will be satisfied. Similarly, total demand in the next quarter is 2,346 units. The supply of subsidized mortgages has shrunk because 2,493 homebuyers obtained subsidized mortgages during the previous quarter. The supply of subsidies available in the second quarter is now 7,591 - 2,493 = 5,098, which still exceeds total demand (2,346). Thus, all of the new and existing demand will be satisfied again in the second quarter.

Total demand for subsidized mortgages will eventually exceed the supply as the supply is gradually exhausted. In the example presented in Table 6, total demand exceeds the supply in the fourth quarter. At this point, the available supply of subsidized mortgages would be rationed in the manner described above, i.e., (463/ 2,133)x524 = 114 for new demand and (1,670/2,133)x524 = 410 for those who would have purchased without subsidies anyway. Thus, over the four quarter period, 2,171 additional purchases would be subsidized in addition to the 5,420 purchases which would have been made anyway. In terms of the net effect, therefore, only 2,171/7,591 = 28.6% of the subsidy will finance induced purchases and the rest (71.4%) would be used to subsidize the purchases that would have been made without any subsidies.

If the subsidy is increased to two percentage points (reduction of interest rate from 16% to 14%), the supply of subsidized mortgages would be 3,820 as shown in Table 3. The demand for subsidized loans at 14 percent is estimated to be 3,316 in the first quarter (1,670 at 16 percent plus 1,646 additional demand due to lowering of the interest rate by two percentage points). Since the demand does not exceed the supply, all of the demand would be satisfied during the first quarter. The supply of subsidized mortgages in the second quarter would then be reduced to 3,820 - 3,316 = 504, while the demand is estimated to be 1,670 at 16 percent plus 1,352 additional demand totaling 3,022. Thus, the available supply must be rationed between those who are induced

to buy houses due to mortgage subsidies and those who would have bought houses without subsidies. Among the induced would-be home buyers, (1,352/3,022)x504 = 225 are likely to be able to get the subsidized mortgages and the rest would delay their purchases until the market interest rate drops or other conditions change.

While the supply of subsidies lasts over three quarters if the interest rate subsidy is one percentage point, it lasts less than two quarters with a two percentage point subsidy. On the other hand, of the 3,820 subsidized mortgages supplied, 49.0 percent (1871) of them would finance the induced home purchases, compared to 28.6 percent with one percentage point subsidy. In other words, smaller subsidies tend to finance more homebuyers (both induced and non-induced) in absolute numbers, but the fraction of subsidies used to finance the induced purchases tends to be smaller with smaller subsidies as shown in Table 7.

The above estimates of the net effect can be compared with the GAO survey result.[14] From a survey of homebuyers who were subsidized through the GNMA's low-interest loans under the Emergency Housing Program of 1974-75, GAO found that 38 percent of the homebuyers would have delayed their purchases if the low-interest loans had not been available. While the GNMA loans had an additional aspect of alleviating the effects of disintermediation and thus cannot be directly compared to our estimates, the GAO result suggests that our estimates are not unreasonable. However, our estimates are based on a method that can be used to estimate the net effect before a program is adopted and executed, while a survey can only be done after the fact.

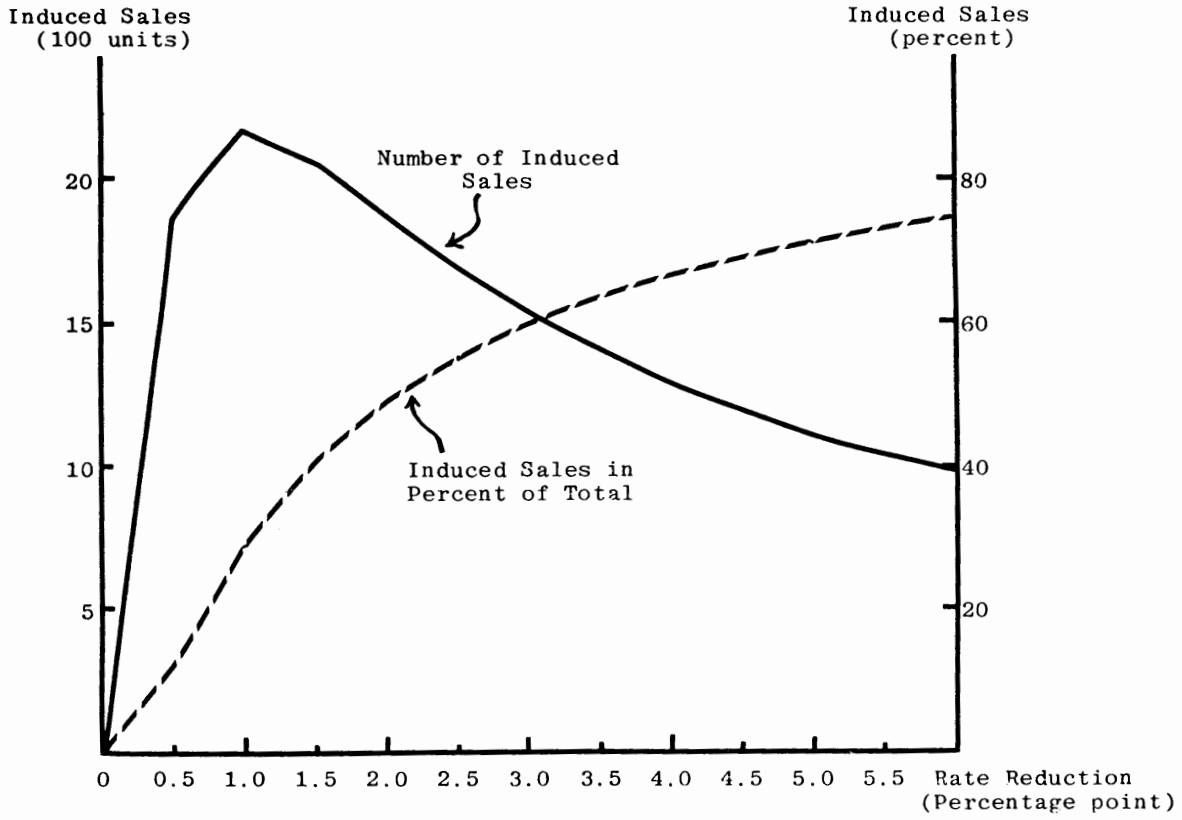
Table 7 shows that, for a given amount of appropriation, the net effect of a subsidy program depends on the number of points by which the interest rate is reduced below market

Table 7
ESTIMATES OF THE DISTRIBUTION OF SUBSIDIES BETWEEN THE INDUCED AND NON-INDUCED PURCHASES

Interest Rate	Induced	(%)	Non-induced	(%)	Total
15.5%	1,847	(12.2)	13,291	(87.8)	15,138
15	2,171	(28.6)	5,420	(71.4)	7,591
14.5	2,055	(40.5)	3,021	(59.5)	5,076
14	1,871	(49.0)	1,949	(51.0)	3,820
13.5	1,693	(55.2)	1,373	(44.8)	3,066
13	1,530	(59.6)	1,035	(40.4)	2,565

14. See the Comptroller General's Report to the Congress, ibid., pp. 12-14.

Figure 3
Relationship between Interest Rate Reduction and the Net Effect



rate. For example, the absolute number of induced sales increases as the interest rate reduction increases from 0 to 0.5 to 1 percentage point. However, as the rate reduction increases further, the number of induced sales decreases. This nonlinear behavior can be explained by the fact that greater interest savings induce greater additional demand resulting in greater net induced sales. However, as the interest reduction is increased further, the supply of subsidized mortgages is reduced and, as a result, the absolute number of net induced sales is also reduced. In contrast, the fraction of the induced sales financed by the subsidized mortgages increases monotonically as the interest rate reduction increases. This is because greater interest savings induce greater additional demand which becomes a greater proportion of total demand. The above relationship between the rate reduction and the net effect is shown graphically in Figure 3.

VI. Conclusions

In this paper, a method of estimating the net effect of an interest subsidy program is developed and applied to a hypothetical example in which the state government makes an appropriation of $25 million. Our method yields results that appear to be comparable to those of a study commissioned by GAO. The methodology is similar to the von Furstenburg model. However, our method treats interest subsidy as a factor that causes a movement along the demand schedule rather than one that shifts the schedule as von Furstenburg does.

Furthermore, this study appears to be the first attempt to systematically estimate the net effect of a subsidy program.

In order to facilitate the estimation of the net effect of a subsidy program, the supply of mortgages is determined first, and a non-linear (in parameters) demand equation estimated next. The resulting estimates show that the greater the interest rate reduction, the greater the fraction of the subsidies that goes to induced homebuyers. However, in our examples, the absolute number of induced purchases was the largest when the interest rate was reduced by one percentage point, and the number decreases as the point reduction increases. The results thus show that there exists a maximum number of purchases that can be induced by an appropriate subsidy rate.

Therefore, mortgage interest subsidy programs can be an effective tool of countercyclical policy at the state, as well as the national, level. However, maximum effectiveness of this tool depends on appropriate timing and design (number of points to be subsidized) of the subsidy programs. The present study shows how such programs can be designed to maximize the net effect or to satisfy any other criteria. Proper timing of the subsidy programs depends on prompt monitoring of the economy and quick legislative and/or administrative actions, but these are beyond the scope of this study.

However, whether or not the interest subsidy program as a countercyclical policy is desirable depends on the ratio of benefits to costs of such programs. While benefits depend on the net effects of the programs, which in turn are determined by the difference between the market rate and subsidized rate of interest, costs of such programs vary depending upon the method of financing. For example, financing by federal-income-tax-exempt securities incurs no cost to the state government but a very small cost is ultimately borne by the state's taxpayers (in higher federal taxes or lower expenditures). On the other hand, under a direct state appropriation all costs are borne by the state.

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APPENDIX I

1. Monthly Payments (Table 1)

Payments are calculated by multiplying the total mortgage amount by the "capital recovery factor" for the given interest rate. If M is the total mortgage amount, then:

$$P = \frac{M(i/12)(1 + i/12)^{12n}}{(1 + i/12)^{12n} - 1}$$

where; P = montly payment amount,
i = interest rate on the mortgage,
n = life of mortgage (e.g., 25 years),
M = total mortgage (e.g., $72,000).

2. Number of Houses That can be Subsidized (Table 3)

The state would buy each mortgage at the total mortgage amount. For example, the state would pay $72,000 for a $72,000 mortgage. But the interest rate carried by the mortgage would be below market. For example, the mortgage interest rate would be 13 percent. Thus to the buyer (from the State), the mortgage value would be less than $72,000. Instead, it would be worth the 25-year (say) stream of payments discounted at the market rate of interest, and the state would have to sell the mortgage at this lower price. Thus the cost to the state would be:

$$M - \frac{M(r/12)(1 + r/12)^{12n}}{(1 + r/12)^{12n} - 1} \cdot \frac{(1 + i/12)^{12n} - 1}{(i/12)(1 + i/12)^{12n}}$$

where M is the total mortgage amount, the left-hand fraction is the capital recovery factor for the subsidized interest rate r (M times that factor is the subsidized monthly payment) and the right-hand fraction is the constant stream factor to discount the stream of payments at the market rate of interest, i, for n years. The number of units that can be subsidized with $25 million is therefore given by dividing $25 million by the cost to the state as described above.

APPENDIX II

1. Derivation of the Demand Equation.

We begin with the following identity:

$$(2) \quad S_t = D(H_t) + rH_{t-1}$$

where S_t stands for the sales of single family houses in quarter t, H_t for the stock of single family houses in quarter t, r the quarterly rate of depreciation of housing stock, and D() stands for first difference operation, i.e., one period change in the variable enclosed in the parentheses.

Change in housing stock is assumed to be determined by the following stock-adjustment equation:

$$(3) \quad D(H_t) = m(H^*_t - H_{t-1})$$

where H^* stands for the desired level of housing stock and m is the speed of adjustment. Substituting (3) into (2) yields:

$$(4) \quad S_t = mH^*_t - (m - r)H_{t-1}$$

Also, from equation (3), we get:

$$(3') \quad H_t = mH^*_t + (1-m)H_{t-1}$$

which implies:

$$(3''), \quad H_{t-1} = mH^*_{t-1} + (1-m)H_{t-2}.$$

Substituting equation (3") into equation (4) yields:

$$(4') \quad S_t = mH^*_t - (m-r)mH^*_{t-1} - (1-m)(m-r)H_{t-2}.$$

and solving equation (4) for $(m-r)H_{t-1}$ gives:

$$(4'') \quad (m-r)H_{t-1} = mH^*_t - S_t$$

which implies:

$$(4''') \quad (m-r)H_{t-2} = mH^*_{t-1} - S_{t-1}.$$

Substitution of (4"') into (4') results in:

$$(5) \quad S_t = mH^*_t - m(1-r)H^*_{t-1} + (1-m)S_{t-1}$$

In order to represent equation (5) in per-capita form, we divide (5) by N_t, the population in quarter t, to obtain:

(6) $s_t = mh^*_t - m(1-r)(N_{t-1}/N_t)h^*_{t-1} + (1-m)(N_{t-1}/N_t)s_{t-1}$

$= mh^*_t - m(1-r)n_t h^*_{t-1} + (1-m)n_t s_{t-1}$

where $s = S/N$, $h = H/N$ and $n_t = N_{t-1}/N_t$.

Assume that the desired per-capita housing stock is a linear function of mortgage interest rate (I), the degree of disintermediation (D), relative price of housing (P), unemployment rate (U), and per-capita real disposable income (Y):

(7) $h^*_t = a + bI_t + cD_t + dP_t + eU_t + fY_t$

Substituting (7) into (6) yields equation (1) of the text:

(1) $s_t = ma(1-gn_t) + mbI^*_t + mcD^*_t + mdP^*_t + meU^*_t$

$+ mfY^*_t + (1-m)n_t s_{t-1}$

where $I^*_t = I_t - gn_t I_{t-1}$, $P^*_t = P_t - gn_t P_{t-1}$, etc.

2. Derivation of the Properties of the Sales Equation.

Holding all variables (including population) constant, the long-run equilibrium level of per-capita sales is determined by solving equation (1) of the text, which can be simplified as:

(8) $s_o = mA + mb(I_o - gI_o) + (1-m)s_o$

where s_o is the long-run equilibrium level of per-capita sales, I_o the interest rate, and A the effect of all other variables. The solution for s_o is given by:

(9) $s_o = A - brI_o$.

If, however, the interest rate changes from I_o to $I_o + K$ in period 1 and remains at the new level permanently, per-capita sales will adjust to the new equilibrium level according to equation (1) of the text, which, after simplification, is solved below for the periods 1, 2, 3, ..., k.

(10) $s_1 = mA + mb(I_o + K) - mbgI_o + (1-m)s_o$

$= mA + mbI_o + mbK - mb(1-r)I_o + (1-m)(A - brI_o)$

$= A - brI_o + mbK$

$= s_o + mbK$ (Note: $g = 1-r$)

(11) $s_2 = mA + mb(I_o + K) - mbg(I_o + K) + (1-m)s_1$

$= mA + mbr(I_o + K) + (1-m)(A - brI_o + mbK)$

$= A - brI_o + mb(1 - (m-r))K$

$$= s_o + mb(1 - (m-r))K$$

$$(12) \quad s_3 = s_o + mb(1 - (m-r) - (m-r)(1-m))K$$

$$\vdots$$

$$(13) \quad s_k = s_o + mb(1 - (m-r) - (m-r)(1-m) - (m-r)(1-m)^2 - \ldots - (m-r)(1-m)^{k-2})K$$

If, on the other hand, the interest rate change lasts, say, for only one qaurter and the rate returns to the original level, I_o, in the second quarter with no further changes, then

$$(11') \quad s_2 = mA + mbI_o - mbg(I_o + K) + (1-m)s_1$$

$$= mA + mbrI_o - mb(1-r)K + (1-m)(A - brI_o + mbK)$$

$$= A - brI_o - mb(m-r)K$$

$$= s_o - mb(m-r)K$$

$$(12') \quad s_3 = mA + mbI_o - mbgI_o + (1-m)s_2$$

$$= mA + mbrI_o + (1-m)(A - brI_o - mb(m-r)K)$$

$$= A - brI_o - mb(m-r)(1-m)K$$

$$= s_o - mb(m-r)(1-m)K$$

$$\vdots$$

$$(13') \quad s_k = s_o - mb(m-r)(1-m)^{k-2}K$$

Equations (10) through (13) represent the time path of per-capita sales after a once-for-all change in the interest rate and (10′) through (13′) represent the per-capita sales over time in response to a temporary change in the interest rate. These equations are graphically represented in Figure 2 of the text.

IV

CAP LAWS AND PROPERTY TAX RATES*

In 1976 legislation known as the "local cap laws" was passed by the State of New Jersey. Like the State cap law, the local laws were designed to control the increasing costs of government, but unlike the State law which limits increases to the rate of growth of nominal per capita personal income, the local municipal purposes and county cap laws permit yearly increases which may not exceed specified percentage of covered spending (5 percent during the years since enactment through the most recent year covered in this report.)

It was the Legislature's declared intent that the "spiraling cost of local government must be controlled to protect the homeowners of the State and enable them to maintain their homesteads." (New Jersey Statutes Annotated, 1976) We interpret this as intending to restrict the growth of property taxes, but the specified approaches were indirect, applying the limit to appropriations in the case of the cap on municipal purposes and to levies in the county cap law.

As presently constituted, the local laws do not assure that tax rates will be contained. A case can be made that the caps should be reformulated to act directly upon tax rates to comply with the intent of the law. This study shows how the existing caps on spending relate to the objective of limiting property tax growth. It is demonstrated that a tax-rate approach differs from the existing method in essentially only one respect: present law does not deduct losses of ratables in determining allowable appropriations, while the tax rate approach would in essence apply net ratable changes (additions minus losses) in determining total allowable levies.

Table 1 below shows that wide variation has occurred in the general tax rates of a selected group of municipalities since the local caps went into effect in 1976.

Table 1 also shows some of the differences that existed in the rate changes of municipalities both before the cap laws were enacted and those that have occurred since that time. Some lack of uniformity in the later period can be easily explained. For example, Newark's general tax rate grew an average of only 0.22 percent per year from 1976 to 1981, a rate increase that was below the 1.70 percent per year in the previous five-year period. For the most part federal and state aid have made it possible for Newark to keep its property tax growth rate below other municipalities. Atlantic City has been experiencing enormous increases in property valuation as a result of the casino boom; the total increase in assessed valuation has allowed taxes to be reduced. Camden,

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*This report was prepared by Adam Broner and Laurence H. Falk, Office of Economic Policy. It owes much to the work of the State's Local Expenditures Technical Review Commission (1982) and to the knowledge garnered through Dr. Broner's participation as a member of that Commission. However, the views of this paper do not necessarily reflect the views of Commission members.

Table 1
SELECTED MUNICIPALITY GENERAL TAX RATE FIVE YEARS BEFORE AND FIVE YEARS AFTER CAP LAW PASSAGE

	General Tax Rates					
	$ per $100 of Assessed Valuation			Average Annual Rate of Change (%)		
Municipality	1971	1976	1981	1971-76	1976-81	1971-81
Newark	9.19	10.00	10.11	1.70	0.22	0.96
Atlantic City	10.37	7.94	5.04	-5.20	-8.69	-6.96
Camden	7.38	8.12	12.30	1.93	8.66	5.24
Glassboro Twp.	4.50	5.63	3.14	4.58	-11.02	-3.53
Highland Park Boro.	10.22	5.40	4.08	-11.98	-5.45	-8.77
Elizabeth	9.66	4.00	4.23	-16.17	1.12	-7.93
Closter Boro.	4.22	3.66	4.69	-2.81	5.08	1.06
Hoboken	9.01	10.61	13.80	3.32	5.40	4.36
Trenton	13.92	8.36	11.18	-9.69	5.99	-2.17

Source: New Jersey Department of the Treasury, Annual Report of the Division of Taxation, various years listed.

on the other hand, had an 8.66 percent average annual increase in the 1976-81 period. (In fact, the local purpose levy rose 13.42 percent between 1981 and 1982 despite the 5 percent allowable limit.)

It is the type of situation that exists in Camden, and in other similar municipalities, that is of significant concern. While there has been a 5 percent limit on annual increases of local purposes and county levies, the handling of lost ratables and a number of exceptions specified in the law allow hard-pressed cities to increase taxes by more than that amount. Increases above the allowable percentage can only worsen an existing vicious circle: rapidly increasing rates cause emigration from the city; emigration causes rapidly increasing rates, etc.

I. Local Caps — General

There are essentially three local cap provisions covering: 1) local municipal purposes, 2) county and 3) local school district budgets. The municipal and county cap laws apply flat percentage increase restrictions to the budgets of most jurisdictions in the State. (Municipalities with tax rates of less than $0.10 per $100 are exempt from the cap law.) The school budget cap law is based on two formulas, one for districts spending above the State average per pupil; the other for districts spending below the average. The school cap formulas utilize changes in equalized property valuations, as well as current and prior year budgets per pupil along with prior year resident enrollments, to determine spending limits.

This report is confined mainly to an examination of local municipal purposes data; however, because of the similarity of municipal and county cap provisions, our conclusions will also have implications for the county cap law. The school budget caps were designed not only to provide taxpayer relief but to effect some equalizing of expenditures per pupil among districts. Any analysis of the effectiveness of these school district caps is beyond the scope of this study.[1]

II. Municipal Purposes Cap

A given year's cap limit for a municipality is the prior year's appropriations (not exempted by law) plus the allowable percentage increase,[2] plus the assessments added during the year preceding the computation multiplied by the current year's municipal purpose tax rate. But there are a number of categories exempted, some with the original legislation and others in later years. Other appropriation categories may exceed the limit if they are covered by special revenues to the municipalities.

Among the items which are not subject to the percentage limitation are: 1) capital expenditures; 2) emergency temporary appropriations (for certain situations posing a threat to health, safety or property); 3) debt service; 4) amounts needed to cover a preceding year's deficit; 5) expenditures mandated by State or federal law after the cap-law effective date; 6) expenditures approved by referendum; 7) certain amounts paid by the municipality under contract with other municipalities' political bodies or subdivisions; 8) amounts required to be paid under provisions of the Hackensack Meadowlands Reclamation and Development Act; 9) programs funded wholly or in part by federal or State funds, and 10) increased expenditures on public utilities, oil or gasoline purchases which exceed the previous year's expenditures by more than 10 percent. Finally, as noted before, the cap law does not apply to municipalities with municipal levies below $0.10 per $100 of assessed valuation.

III. Effect of the Law on Local Property Taxes

It is possible that the 5 percent allowance has done little or nothing to restrain property tax growth, especially in light of the number of exceptions that have been allowed. It is therefore pertinent to examine property tax data to see if there is any evidence that the law has actually held down property taxes.

While a number of states in the United States have limits on property tax increases, other do not. In Table 2 we see that in the United States, as in New Jersey, the property tax share of total general revenues has been declining. (New Jersey from 51 to 29 percent from 1960 to 1980; the United States 32.5 percent to 17.9 percent in the same period). The New Jersey decline rate was less than that for the United States in the pre-cap

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1. The interested reader may wish to refer to reports by Knickman and Reschovsky (1978) and Rubin (1979) examining the effects of the 1975 Public School Education Act on spending patterns in the State.
2. Five percent prior to the 1983 legislation (S-2016) which limits appropriation increases to the lesser of 5 percent or the rate of increase in the implicit price deflator for purchases of state and local goods and services or, if the deflator is larger than five percent, a locality can vote to increase appropriations by the rate of increase of the deflator.

Table 2
STATE AND LOCAL GOVERNMENTS PROPERTY TAX SHARE
1960-1980

	Property Tax As A Share of General Revenues (%)			Average Annual Rate of Change in Share (%)	
	1960	1976	1980	1960-76	1976-80
N.J.	51.0	38.0	29.0	-1.82	-6.53
U.S.	32.5	22.3	17.9	-2.33	-5.35

Source: United States Department of Commerce, Bureau of the Census, Statistical Abstract of the United States, various years.

period 1960-1976, but greater than the U.S. rate in 1976-1980 when the cap law was in effect. This suggests, all other things held constant, that the New Jersey caps have been effective in holding down property taxes. New Jersey property taxes were declining only about three-fourths as fast as the U.S. in the pre-cap period; but under the cap, they declined over 20 percent faster than the U.S. overall.

Among the factors assumed constant in this reasoning are differences in total general revenue growth and in population growth in New Jersey vs. all of the states in the United States. Table 3 examines growth rates for these two factors in the before-and-after cap periods.

In Table 3 we see that general revenues grew faster in New Jersey than in all states in the 1960-76 period (11.1 vs. 10.7 percent per annum), but slower in the 1976-80 period (10.2 vs. 10.5 percent). Again, this appears to attest to the effectiveness of the caps; the growth rate for New Jersey revenues seems to have been dampened by the caps by more than the reduction that could be expected based on national performance. Reductions in property tax growth do

Table 3
STATE AND LOCAL GENERAL REVENUE AND POPULATION AVERAGE ANNUAL GROWTH RATES (%)

	General Revenues		Population	
	1960-76	1976-80	1960-76	1976-80
N.J.	11.1	10.2	1.20	0.06
U.S.	10.7	10.5	1.22	1.01

Source: United States Department of Commerce, Bureau of the Census, Statistical Abstract of the United States, 1981.

not seem to have been made up by increases in growth of other general revenues. However, the population differences may be telling a different story. New Jersey population growth was almost as great as the United States rate in the pre-cap period (1.20 vs. 1.22) but far below the U.S. rate in the post-cap years. This suggests that increases in demand (or need) for revenue increases were lower for the State than for the rest of the country, and perhaps it is this slower population growth that has held down New Jersey's property tax growth relative to the U.S.

Thus, an examination of state and national data offers some evidence of the effectiveness of New Jersey's cap laws. Nevertheless, since the evidence is not fully conclusive, we turn to additional state data for further analysis.

Table 4 shows the behavior of New Jersey local purposes property tax levies, plus veteran and senior citizen taxes. The table adds to these levies the State aid that commenced with the State income tax passed in 1976. Prior to 1976, municipalities levied extra property taxes to cover the costs of special tax deductions granted to veterans and senior citizens ($50 and $160 per deduction, respectively). Beginning with the 1976 changes, the State has met these obligations out of proceeds of the State income tax. In addition to paying for the veterans and senior citizens deductions totaling about $50 million per year, another $50 million in general revenue sharing has been granted municipalities since the onset of the State income tax. Local property taxes could, therefore, be reduced by $100 million due to State action without any local economies. Thus, we need to consider this $100 million per year in examining the effect of caps on local property tax levies or expenditures. Moreover, since different before-and-after cap rates of inflation could explain all or part of the observed variation in levies, we also examine in Table 4 the effect of inflation on the costs of local government.

An examination of the figures again supports the conclusion that the caps have been effective in curbing local levy increases. Levies from 1970 to 1976 grew at an average annual rate of 10.4 percent. The 1976-1982 growth rate was 3.8 percent per annum, 5.5 percent if State aid is added. But a more careful analysis reveals that State aid is reponsible for what is essentially a reduction in the level (a downward shift of levies); this results in an apparent reduction in the levy growth rate. Levies fell from $820 million in 1976 to $735 million in 1977 and grew only slightly through 1979, when the total reached only $754 million. But once this adjustment in level was complete, the yearly rate of increase approximated the 10.4 percent pre-cap rate. In 1980 the rate of increase had returned to 10.1 percent from the 1979 increase of only 1.2 percent. In 1981 and 1982 the increases were 11.2 and 11.3 percent, respectively. When state aid from the income tax is added, a temporary reduction is seen, from the before-cap 10.36 percent average annual rate of growth to 1.8, 1.2 and 1.1 in 1977, 1978 and 1979, respectively. Again, the increases of 8.9, 10.0 and 10.2 percent levies plus aid, for 1980, 1981 and 1982, respectively, approximate the 1970-76 average growth rate. Thus, state aid plus the cap may have caused a temporary downward shift without materially affecting the long-term rate of growth of levies.

The upper lines in Figure 1 illustrate this situation. The property tax levy trends can be divided into three discernible stages:

FIGURE 1

LOCAL MUNICIPAL TAX LEVY

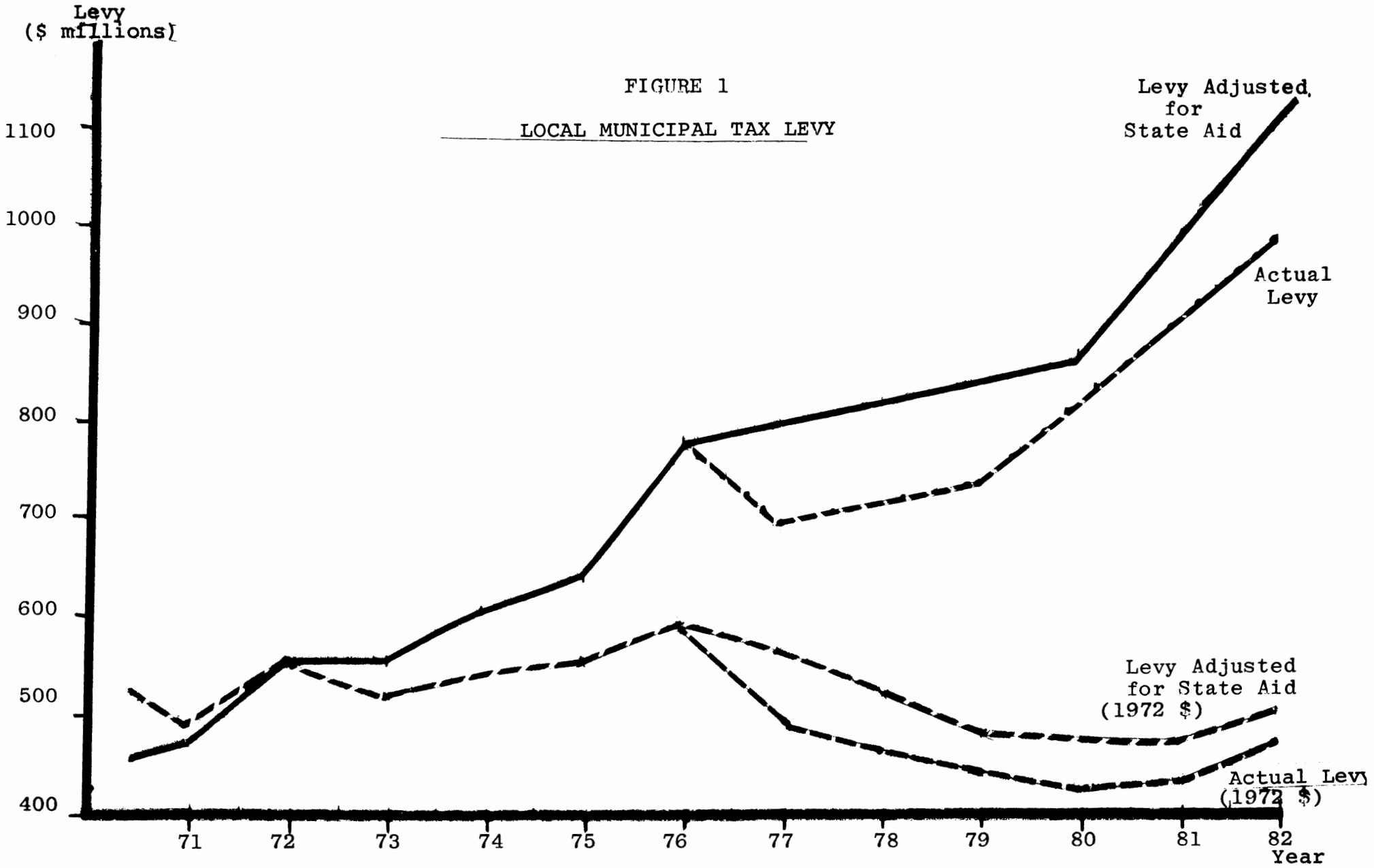

Table 4
CHANGES IN MUNICIPAL TAX LEVIES AND STATE AID, 1970-82

Year	Actual Levy -- Municipal Purposes Levy Plus Veterans Senior Citizen Taxes	Actual Municipal Purpose Levy Plus Aid Coming From Income Tax Proceeds	State and Local Implicit Price Deflator 1972 = 100	Actual Levy Millions of 1972 $	Actual Levy Plus Aid Millions of 1972 $
(1)	(2)	(3)	(4)	(5)	(6)
1970	$453.84 mill.	$453.84	88.1	515.14	515.14
	(2.61%)	(2.61%)		(-4.13)	(-4.13)
71	465.71	465.71	94.3	493.86	493.86
	(20.28)	(20.28)		(14.46)	(14.46)
72	560.19	560.19	99.1	565.28	565.28
	(.19)	(.19)		(-6.51)	(-6.51)
73	561.27	561.27	106.2	528.50	528.50
	(10.36)	(10.36)		(0.17)	(0.17)
74	619.41	619.41	117.0	529.41	529.41
	(14.11)	(14.11)		(3.58)	(3.58)
75	706.81	706.81	128.9	548.34	548.34
	(16.02)	(16.02)		(8.61)	(8.61)
76	820.05	820.05	137.7	595.53	595.53
	(-10.36)	(1.84)		(17.10)	(-5.71)
77	735.10	836.10	148.9	493.69	561.52
	(1.32)	(1.16)		(-4.58)	(-4.84)
78	744.77	844.77	158.1	471.08	534.33
	(1.24)	(1.09)		(-6.56)	(-6.70)
79	754.00	854.00	171.3	440.16	498.54
	(10.06)	(8.88)		(0.56)	(1.63)
80	829.86	929.86	189.6	437.69	490.43
	(11.25)	(10.04)		(2.24)	(1.13)
81	923.21	1,023.21	206.3	447.51	495.98
	(11.34)	(10.23)		(3.70)	(2.67)
1982	1,027.92	1,127.92	221.5	464.07	509.22
Average Annual Growth Rate:					
1970-76	10.36%	10.36%	7.73%	2.45%	2.45%
1976-82	3.84	5.46	8.24	-4.07	-2.58

Sources: New Jersey Department of the Tresury, Annual Report of the Division of Taxation, various years listed; U.S. Bureau of Economic Analysis, Survey of Current Business, various issues.

Note: Figures in parentheses are growth rates from year to year.

1. 1970-76 -- before caps imposed; 10.4% annual growth.
2. 1976-79 -- initial years under caps, 2.8 percent annual rate levy decline. This decline is largely illusory, however, since it was made possible by the $100 million increased State aid. To avoid reducing expenditures, municipalities would otherwise have been forced to increase levies by $100 million and levies would have grown by 1.4 percent per annum.
3. 1979-82 -- after adjustment to caps, levies grew by 9.7 percent annually, a rate almost double the 5 percent allowable increase in covered appropriations, and approximating the rate of growth of levies prior to the cap law.

In the second stage, the rate of growth was only 1.4 percent, even after adjusting for State aid. This is a significant drop from the 10.4% before-cap rate. This reduction can be attributed to at least two factors: 1) the original cap mandate contained relatively few exemptions; 2) local governments were apparently willing to live within the cap restrictions and found initial spending reductions, fairly easy to absorb.

In stage 3, levies resumed growth approximating the rates existing before the cap law. This resumption is apparently related to the inability of the State government to further increase State aid to municipalities, and the State's granting of liberal exemptions to the cap law. Figure 1 illustrates the three stages and clearly shows the immediate and long-run effect of the State aid increase. While there appears to be some short-run effect of the cap law, the long-term growth of levies shows little change.

An examination of real levies, deflated by the implicit price index for state and local purchases of goods and services, portrays a picture that is at once similar and dissimilar to the above. The rightmost two columns in Table 4 and the lower lines in Figure 1 illustrate these two situations. Real levies, with and without adjustment for State aid, display stages similar to those found above.

First, there is a slight growth trend (+2.4 percent per annum from 1970 to 1976), then a second stage drop from 1976 to 1979, and, finally, after adjustment to the caps, the original growth rate is essentially resumed. The dissimilarity is in the overall trend of levies. Whereas nominal levies display a steeply rising trend over the entire twelve-year period, and deflated actual levies show a decline, the trend for real adjusted levies is essentially flat. That is, real local spending, including state aid, has been approximately constant (witness from Table 4 the fact that the 1982 levy is virtually unchanged from the 1970 adjusted figure).

In sum, we have examined the data in an attempt to determine whether or not the cap law has actually resulted in any decrease in the rate of growth of levies (by themselves and plus state aid). We have found evidence that the law resulted in a temporary decline, but when state aid is considered the pre-cap rate of growth was ultimately resumed. We hasten to add that the cap law (with the aid) has apparently lowered levies, but a number of factors complicate the analysis; for example, both federal and state aid can lower local purposes taxes, and great changes have occurred in the receipts from both sources.

Our finding that, for all practical purposes, there has been no <u>real</u> growth in levies plus state aid since the early 1970's appears to reflect two effects, a moderate real increase from 1970 to 1976, and an offsetting

decrease apparently caused by the caps thereafter. However, the upward trend may have been resumed in the latest year or two after the initial effects of expanded state aid wore off.

IV. A Tax-Rate Alternative

The existing municipal cap law applies a percentage increase limitation to appropriations. But legislative intent appears to have been directed toward property taxes rather than appropriations. It is, therefore, instructive to compare the present approach to one which would apply the present allowable percentage increase directly upon municipal purpose tax rates. It will be shown that the two approaches do not differ much. However, present practice treats ratable losses in a manner that differs from the tax-rate approach; the difference points up what we consider to be a serious defect in the existing system.

If the cap legislation is intended to restrict the growth of property taxes, then a change should be made to eliminate the present assymetry in handling ratable changes and avoid violating that intent. Additions — new or improved ratables -- are included in new allowable appropriation totals at their assessed values multiplied by the preceding year's municipal purpose tax rate. But reductions —largely demolished properties — are not deducted from the base in the year they are lost, or any year thereafter. As a result, declining municipalities are not required to reduce total collections to reflect the property losses; in fact, they may add the allowable percentage each year to a portion of appropriations reflecting the losses of the most recent year plus losses of past years with the allowable percentage compounded each year on accumulated losses. (The arithmetic of these calculations is presented in a later section and in the Appendix.) The result can be most undesirable. If a declining municipality were to use all of its allowable increase, the result of the present approach to ratable reductions would be to increase appropriations, as a consequence, raise property tax rates. Higher rates in such municipalities often lead to further abandonment of property and further losses of ratables, higher taxes, further abandonment of property and so on. In short, the present approach to the handling of lost ratables promotes a vicious circle which can hasten the decline of municipalities which use all of their allowable increases.

If the legislative dictum that the "cost of government must be controlled to protect the homeowners of the State" is to be followed, capping property taxes directly would seem to be the most straightforward approach. Accordingly, we describe such a method in this report and compare it to the present procedure.

A tax-rate approach would handle symmetrically all changes in the tax base. An increase in ratables would result in additional demands for local services, hence a need for additional revenue. Losses of ratables should ultimately result in a reduction in demand for services (and revenues). The tax-rate approach would appropriately consider both gains and losses by applying the current (increased) rate to the current base which incorporates additions and excludes losses.

V. Calculating the New Rate

Three possibilities exist for a municipality's assessment of ratables. First, additions and losses during a given year may be registered at old values (values in year t-2). Then:

$$A_t = (1+r)(A_{t-1} + a_g - L) \quad (1)$$

where:

A_t = Value of total assessments in current year t.

r = The reassessment rate of increase from year t-1 to year t.

A_{t-1} = Value of total assessments in previous year t-1.

a_g = Gross additions to ratables over time t-1 to t.

L = Lost ratables between t-1 to t.

A second possibility would be that losses and additions are registered at new values. New total assessments would then be:

$$A_t = (1+r)\ A_{t-1} + a_g - L \quad (2)$$

Finally, and probably the most usual situation, losses can be dropped from the rolls at last year's assessment values while additions are recorded at the new assessed levels. Then:

$$A_t = (1+r)(A_{t-1} - L) + a_g \quad (3)$$

Solving (3) as the most likely situation, we get:

$$(1+r) = (A_t - a_g)/(A_{t-1} - L) \quad (3')$$

Under a tax-rate approach to municipal purposes caps, the new tax revenues generated by applying the new tax rate (R_t) to the reassessed existing properties less lost ratables must be equal to one plus the allowable rate of increase (I_t) times the old revenues from the same properties at the old tax rate (R_{t-1}) and old assessment, i.e.,

$$R_t(1+r)(A_{t-1} - L) = (1+I_t)R_{t-1}(A_{t-1} - L) \quad (4)$$

Solving (4) for R_t, the new tax rate, gives:

$$R_t = (1+I_t)R_{t-1}/(1+r) \quad (5)$$

which means that the new tax rate equals the old tax rate increased by the allowable rate adjusted for the reassessment rate. The allowable rate of increase (I_t) is determined by law.

Substituting (3') into (5) gives a formula for calculating the new tax rate, R_t:

$$R_t = R_{t-1}(1+I_t)(A_{t-1}-L)/(A_t - a_g) \quad (6)$$

To give an example, say, the 1981 property tax rate was \$3 per \$100, the municipality chose to exceed the 5 percent limit in favor of the implicit deflator which was up 7.4% (second quarter '82 over second quarter '81), valuations totalled \$1,000,000 in 1981 and \$1,100,00 in 1982, and a_g and L were \$60,000 and \$40,000, respectively. Then:

$$R_t = \frac{\$3(1.074)(\$1,000,000 - \$40,000)}{(\$1,100,000 - \$60,000)}$$

$$= \$2.974 \text{ per } \$100$$

which is a rate lower than the 1981 rate since it is to be applied to the greater 1982 valuations of the same property.

The new tax rate is then applied to the new assessed value of real property to obtain total property tax revenue. In our example, total revenue from property taxes in 1982 is \$1,100,000 x \$2.974/\$100 = \$32,714. In 1981, total tax revenues were \$1,000,000 x \$3.00/\$100 = \$30,000. The revenue increase (\$2,714) is 9.05 percent, which exceeds the price-deflator increase because the example includes real growth, i.e., added ratables and loss components.

If we only consider the ratables carried over from 1981 to 1982, i.e., $A_{t-1} - L$ = \$1,000,000 - \$40,000 = \$960,000, this would have generated

$960,000X$3/$100 = $28,800 of revenues in 1981. The same ratables after the reevaluation (by +8.33%) became $1,100,000 - $60,000 = $1,040,000, which would have generated $31,200 at the old tax rate, a 8.33% increase from $28,850.

However, the proposed formula allows an increase equal to I_t determined by law (7.4% in 1982), and as a result, the new tax rate is reduced to $2.974 per $100. Applying the new tax rate to the reevaluated existing properties ($1,040,000) yields $30,930 of revenues for 1982, which is 7.4% higher than $28,800 for 1981.[3]

If there is no reassessment, r is zero and equation (5) may be restated as:

$$R_t = R_{t-1} (1+I_t) \qquad (5')$$

And, from equation (3′) with r equal to 0

$$(A_{t-1} - L)/(A_t - a_g) = 1$$

hence, equation (6) becomes

$$R_t = R_{t-1} (1+I_t) \qquad (6')$$

i.e., the tax rate in the current year is equal to the previous year's tax rate increased by I_t, the allowable rate of increase.

VI. Comparison of Existing and Tax Rate Approaches

To compare the existing law with the tax-rate approach, we begin with actual assessed valuations and expenditures in 1976, the year before the New Jersey law went into effect. We assume that the allowable increase each year was 5 percent (as indeed it was). In our calculations for 1977 through 1981, we use actual data for total assessed valuations and added ratables, but our computations of allowable expenditure (and rates) after 1976 derive from 1976 spending and the assumption that all additional spending allowed under the cap is actually spent. Moreover, we have not attempted to quantify exceptions to derive actual capped expenditures. Thus, we have hypothetical spending figures for 1977-81; no comparison can otherwise be made.

We have taken Newark for our example of cap calculations, and we limit our comparisons to the municipal purposes portion of the budget. In accordance with our understanding of the actual situation in Newark, we assume that there has been no general reevaluation of the City's ratables during the period covered.

Table 5 traces the allowable cap changes through the period from 1976 to 1981 applying the law in effect during that period. Each year, expenditures of the previous year are increased by 5 percent and added to the product of ratable additions times the previous year's rate plus 5 percent. In the five-year period covered, the resulting municipal-purposes rate increased from $5.99 to $9.01 per $100 or 50 percent which gives a compound rate of 8.5 percent per annum.

In Table 6 we have made computations using present procedures with one exception: we have used net instead of gross additions to ratables; that is, we have deducted ratable losses. Here we see the rate increasing from $5.990 to $7.645 per $100, or 27.6 percent which yields the

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3. Applying the hypothetical data to (3′), we get the rate of reassessment, r = 0.083. This exceeds I_t (0.074). Had the reassessment rate been lower than I_t, the new tax rate would have been higher than the old rate.

Table 5
EXAMPLE OF PRESENT CAP LAW CALCULATIONS

Year	Allowable Expenditures Before Additions (Previous Year's Expenditure From Col.5 x 1.05)	Gross Added Ratables	Allowable Expenditures From Additions (Previous Year's Rate From Col.7 x Col.3 x 1.05)	Total Allowable Expenditures (Col.2 + Col.4)	Total Assessments Current Year	Current Year's Rate/$100 (Col.5/Col.6)	Year to Year Rate Increase (From Col.7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1976	—	—	—	$64,788,562*	$1,081,594,200	$5.9901	—
77	$68,027.990	$4,129,200	$259,710	68,287,700	1,031,321,400	6.6214	10.5
78	71,702,085	8,492,200	590,458	72,292,542	1,010,486,000	7.1542	8.0
79	75,907,169	7,478,700	561,795	76,468,965	985,666,200	7.7581	8.4
80	80,292,413	9,125,400	743,355	81,035,768	965,906,600	8.3896	8.1
81	85,087,556	8,942,500	787,753	85,875,309	952,934,900	9.0117	7.4

Sources: Unpublished data of Division of Taxation, Department of the Treasury. Annual Report of the Division of Local Government Services, Department of Community Affairs, various years.
*Actual expenditures for the final year before the cap limits.

Table 6
EXAMPLE OF PRESENT CAP LAW CALCULATIONS WITH DEDUCTIONS OF LOST RATABLES
Newark City — Municipal Purposes Budget

Year	Previous Year's Expenditures	Gross Added Ratables	Lost Ratables	Previous Year's Rate (Col.8 x Col.3 -Col.4 x 1.05)	Total Allowable Expenditures (Col.2 x 1.05 + Col.5)	Total Assessments Current Year	Current Year's Rate (Col.6/Col.7)	Year to Year Rate Increase (From Col.8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1976	—	—	—	—	$64,788,562*	$1,081,594,200	$5.9901	—
77	$64,788,562	$4,129,200	$54,398,000	($3,161,708)	64,866,292	1,031,321,400	6.2896	5.0%
78	64,866,282	8,492,800	29,328,000	(1,375,979)	66,733,617	1,010,486,000	6.6041	5.0
79	66,733,617	7,478,700	32,298,000	(1,721,049)	68,349,249	985,666,200	6.9343	5.0
80	68,349,249	9,125,400	28,885,000	(1,438,704)	70,328,007	965,906,600	7.2810	5.0
81	70,328,007	8,942,500	21,914,200	(991,698)	72,852,709	952,934,900	7.6451	5.0

Sources: Unpublished data of Division of Taxation, Department of the Treasury; Annual Report of the Division of Local Government Services, Department of Community Affairs, various years.
*Actual expenditures for the final year before the cap limits.

compound rate of 5.0 percent per annum.

Thus the 5 percent increase on expenditures is achieved only when expenditures representing the lost ratables are deducted. If the Legislature desires to allow a flat yearly percentage increase in expenditures, it can only do so by requiring the deduction of amounts representing spending on ratables that have been lost. Otherwise, each year the effective rate will rise by an amount determined by the losses of all previous years. This cumulative effect causes increases that are greater than 5 percent. Comparing the rightmost columns of Table 5 and 6, the Newark example results in allowable expenditure increases of from 7.4 to 10.5 percent when losses are not deducted; in contrast, each year's increase is only 5 percent when they are. The dollar difference (column (8), Table 5 minus column (10), Table 6 grows ever wider; the present system produces $3.4 million more in taxes in 1977 and $13.0 million in 1981 reflecting the compound growth element caused by the present handling of losses.

Our concern with the situation is this: failure to require the deduction of losses results in greater increases than those intended under the cap law. Other things equal, the greater the losses in any year, the greater is the rate increase. And the greater the rate increase, the worse is the problem for a declining city. Taking this to the logical (but absurd) conclusion, the final situation for the declining city is one of astronomical taxes with but one person left to pay them. But the absurdity should not hide the truth: fewer and

Table 7
EXAMPLE OF CAP LAW CALCULATIONS USING TAX-RATE APPROACH
Newark City -- Municipal Purposes Budget

(1) Year	(2) Previous Year's Rate/$100	(3) Current Year's Rate/$100 (Col.2X1.05)	(4) Total Assessments Current Year	(5) Total Revenue Current Year (Col.3XCol.4)
1976	--	--	$1,081,594,200	$64,788,566*
1977	$5.9901	$6.2896	1,031,321,400	64,866,030
1978	6.2896	6.6041	1,010,486,000	66,733,344
1979	6.6041	6.9343	985,666,200	68,348,935
1980	6.9343	7.2810	965,906,600	70,327,685
1981	7.2810	7.6451	952,934,900	72,852,376

Source: Annual Report of the Division of Local Government Services, Department of Community Affairs, various years.
*Actual expenditures for the final year before the cap limits.

fewer people would be forced to pay higher and higher taxes.

Table 7 shows calculations of Newark rate limits and revenues using the tax-rate approach. The figures in the next-to-final column are equal to the "Total Expenditures Current Year" column in Table 6 (except for negligible differences caused by rounding). Thus, we see that an expenditure approach is, in principle, equal to the tax-rate alternative approach. The only difference arises from the method of handling lost ratables.

Table 8 compares actual property tax rates in Newark to the rates the city could have used under existing law. It can be seen that actual rates fell far short of the rates that could have been levied. This is explained, for the most part, by Newark's receipts of federal aid which obviated the need to increase taxes for some municipal purposes.

Table 8
COMPARISON OF ACTUAL MUNICIPAL PURPOSES RATE TO RATES ALLOWABLE UNDER PRESENT CAP LAW
Newark City

Year	Municipal Cap Allowable Rate Per $100	Equalized Rate Per $100	Equalization Ratio	Actual Rate Per $100	Percentage Difference (Actual vs. Allowable)
(1)	(2)	(3)	(4)	(5)	(6)
1977	$6.62	$3.19	.6702	$4.76	-28.1
78	7.15	2.50	.6508	3.84	-46.3
79	7.76	2.19	.6068	3.61	-53.5
80	8.39	2.45	.5495	4.46	-46.8
81	9.01	2.09	.5196	4.02	-55.4

Source: Annual Report of the Division of Local Government Services, Department of Community Affairs, various years.

VII. Conclusions

The data indicate that New Jersey's local cap laws have been effective in keeping down property tax rates. However, in some instances at least, appropriations have risen faster than the rate prescribed by law. This is explained by the many exceptions allowed; spending financed by federal aid, for example, is not subject to cap provisions.

While appropriations representing ratable additions are added to the spending base in determining cap allowables, amounts representing lost ratables are not deducted. This approach presents a problem for declining municipalities. Losses occasion an ever-increasing element in permissible appropriation totals and, of course, higher allowable appropriations also mean higher taxes. Thus declining municipalities, those which

experience losses in net ratables, are allowed to increase tax rates more relative to stable or growing municipalities.

It has been suggested that the costs of government in a declining city do not fall in proportion to ratable losses. Even if this is so, it does not mean that the costs should be offset by higher taxes. Increasing taxes only makes the situation worse. Instead of allowing increases, the State should look upon ratable losses as an index of decline and of the need for state aid.

A different approach to local caps has been illustrated in this report. The procedure would add the allowable percentage increases on tax-rates per se rather than on appropriations. It is shown that the tax-rate approach is identical to the present approach provided appropriations representing what would have been spent on lost ratables are deducted.

We have confined our analysis to the local municipal purposes portion of municipal budgets. While it is tempting, we cannot generalize our conclusions to all local property taxes -- those of school districts and counties as well as municipalities. The school cap law not only allows changes in spending per pupil, but it also provides for some equalization to bring low-spending districts up toward the State average.

The county cap procedure is closer to the municipal approach and only one step removed from the tax-rate method we have described. The county-cap method applies increases to levies, i.e., tax-rate times assessments. Moreover, the system for computing assessment totals deducts lost ratables and thus avoids exacerbating the problem posed by present procedures for declining municipalities.

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APPENDIX

Cumulative Effect of Failure to Deduct Lost Ratables

In the body of this report we referred to the cumulative effect on caps of the failure to deduct lost ratables each year. Added ratables produce increased allowable expenditures for municipalities, but lost ratables are not deducted. Hence, that part of expenditure determined by any years' losses will increase exponentially every year thereafter.

If a one-year loss (in year t-1) is incurred, total expenditures allowed in year t will be higher than they should be by:

difference = (amount of assessments lost) X (rate in current year).

Assuming that the yearly allowable increase is five percent, in the following year the losses remain in the base and expenditures will be too high by the amount previously determined plus five percent plus losses of the new year. And the extra yearly allowances continue in the following manner (illustrated for the year 1977 and forward).

$$d_{77} = L_{77}R_{77}$$

$$d_{78} = L_{77}R_{77}(1.05) + L_{78}R_{78}$$

$$d_{79} = L_{77}R_{77}(1.05)^2 + L_{78}R_{78}(1.05) + L_{79}R_{79}$$

$$d_T = L_tR_t(1.05)^{T-t} + L_{t-1}(1.05)^{T-t-1} + \ldots$$

$$+ L_{T-1}R_{T-1}(1.05) + L_TR_T$$

where d_T = the total difference in allowed expenditures in any year T,

t = the beginning year ('77 in the present case),

T = the year for which each amount is calculated (for d_{79} above, T = 79)

R_T = the property tax rate for year T

L_t = represents ratables lost in the current year

Any of the above expressions for d_T shows the total difference for one year only. If we should want the cumulative difference over time, C_t, we must sum all d_T's, i.e.,

$$d_t + d_{t+1} + d_{t+2} + \ldots + d_T = C_t$$

The effect that losses have on property tax rates should be clear. Under present law, ratable losses cause allowed expenditures to rise in the initial year and cumulative every year thereafter. Permitting ratable decreases to remain in the base for calculating allowable expenditures increases results in ever-rising tax rates, higher than the annual increases stated in the cap laws.

V

NEW JERSEY STATE AND LOCAL GOVERNMENT EXPENDITURES*

Introduction

This paper examines the level of per capita expenditures by the State and all local governments. It attempts to compare New Jersey's public sector expenditures with other states.

In Section I, New Jersey's revenues are analyzed in relation to aggregate economic indicators. The Section also provides a comparison of major expenditure categories in New Jersey and 48 contiguous U.S. states. Section II consists of a regression analysis of New Jersey's overall expenditures and various major expenditures subcategories. Section III provides some qualifications and conclusions.

I.New Jersey and U.S. Revenues and Expenditures Compared.

During the period 1970-1980 New Jersey's State and Local Government's general revenues from taxes and charges (own source) increased by 42% in real terms, i.e., after adjustment for inflation. In the same period New Jersey's population growth was minimal (2.7%), and real per capita personal income increased by only 19%. As a result, the proportion of own source revenue to State personal income increased from 11% in 1970 to 13% in 1980. The situation is even more dramatic when the State's taxes and charges are considered separately from local taxes. The increase in State revenues was 69% in real terms. New Jersey state government taxes and charges, as a percentage of personal income increased from 4.7 in 1970 to 6.6 in 1980.

The growth in local government revenues was in line with the growth of personal income. It should, however, be kept in mind that a large part of the State's increased revenue is transferred to local governments. By 1980, transfer of funds from State government to local government reached $3 billion, or over 40% of the total State general revenues (see Table 1).

New Jersey's State and Local Government financial trends differ somewhat from the nation as a whole (Table 1). While "All States" general revenue from own sources increased approximately at the same pace (42%) as in New Jersey, the result of that increase for the tax burden is much milder. The reason is that the U.S. growth of population and of per capita personal income was substantially higher than in New Jersey. National population growth between 1970 and 1980 was 11.1%, or four times that of New Jersey (row 6, Table 1), and real U.S. per capita personal income increased by nearly 25% or 6 percentage points more than in New Jersey (row 5). Since population and per capita income growth directly affect the

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*Prepared by Jerzy Zachariasz, Office of Economic Policy.

Table 1
STATE AND LOCAL GOVERNMENT GENERAL REVENUES FROM OWN SOURCES

	NEW JERSEY						ALL STATES					
				Percent of Change						Percent of Change		
	1970	1975	1980	1975/1970	1980/1975	1980/1970	1970	1975	1980	1975/1970	1980/1975	1980/1970
CURRENT PRICES												
1. Total Revenue (mill. $)	3,787	6,514	10,407	71.9	59.8	174.7	108,889	181,141	299,293	66.4	65.2	174.9
a. State Government	1,605	2,658	5,291	65.6	99.1	229.7	57,507	96,784	169,266	68.3	74.9	194.3
b. Local Government	2,182	3,857	5,116	76.8	32.7	134.4	51,382	84,357	130.027	64.2	54.1	153.1
c. Local Revenue as a % of Total	58	59	49				53	47	43			
1980 PRICES												
2. Total Revenue (mill. $)	7,324	9,307	10,407	27.0	11.8	42.0	210,596	258,835	299,293	22.9	15.6	42.1
a. State Government	3,104	3,798	5,291	22.4	39.3	69.4	111,221	138,296	169,266	24.3	22.4	52.2
b. Local Government	4,220	5,511	5,116	30.6	-7.2	21.2	99,375	120,539	130,027	21.3	7.8	30.8
3. Per Capita Revenue ($)	1,022	1,268	1,413	24.1	11.4	38.3	1,036	1,201	1,321	15.9	10.0	27.5
a. State Government	433	516	718	19.2	39.1	65.8	547	642	750	17.4	16.8	37.1
b. Local Government	589	751	695	21.5	-7.5	18.0	489	559	574	14.3	2.7	17.4
4. Revenue as a % of Personal Income	11.4	13.0	13.0	17.1	0.0	17.1	13.6	14.3	13.9	5.2	-2.8	2.2
a. State Government	4.7	5.3	6.6	12.8	24.5	40.4	7.2	7.7	7.9	6.9	2.6	9.7
b. Local Government	6.4	7.7	6.4	20.3	-16.9	0.0	6.4	6.7	6.0	4.7	-10.4	-6.3
5. Per Capita Personal Income ($)	9,177	9,708	10,924	5.8	12.5	19.0	7,629	8,374	9,521	9.8	13.7	24.8
6. Population (1000)	7,171	7,341	7,364	2.4	.3	2.7	203,300	215,470	226,500	6.0	5.1	11.1

Sources: Statistical Abstract of the United States, Bureau of the Census, Department of Commerce, various issues.
Values in 1980 prices are calculated by the author using appropriate implicit deflators.

proportion of tax revenue to personal income, that proportion for the nation as a whole increased only by 0.3 percentage points, while the respective increase for New Jersey was 1.9 percentage points (row 4, Table 1).

The tendency of faster growth in State revenues from own sources noted in New Jersey, reflects the national trend. However, the impact on changes in the tax burden is less dramatic for the U.S. (rows 2a and 2b). The proportion of state government revenue in personal income increased in the U.S. by 0.7 percentage point, while the proportion for local government declined by 0.4 percentage point (row 4a).

The data reveal that although New Jersey's own source of general revenue as a percentage of personal income increased faster than the nation's, that proportion in 1980 was still somewhat below the nation's average, 13.0% vs. 13.9% (row 4). It should, however, be noted that in 1970 the difference was much larger: 11.1% for New Jersey vs. 13.6% for "All States." It should also be pointed out that public perception of tax changes focus on changes over time in individual states rather than comparisons to "All States" averages.

The sources of state and local general revenue in New Jersey differ markedly from those of the U.S. as a

TABLE 2
STATE AND LOCAL GOVERNMENT GENERAL REVENUE BY SOURCE, 1980

	NEW JERSEY				
	Million Dollars	Per Capita Dollars	% of Total		
Total Revenue	12,687	1,723	100		
From Federal Government	2,279	309	18		
From Own Sources	10,407	1,413	82	100	
Charges & Miscellaneous	2,031	276		20	
Taxes, Total	8,376	1,137		80	100
Property Tax	3,673	499			44
Other	4,703	638			56
	ALL STATES				
Total Revenue	382	1,688	100		
From Federal Government	83	367	22		
From Own Sources	299	1,322	78	100	
Charges & Miscellaneous	76	335		25	
Taxes Total	223	987		75	100
Property Tax	68	302			31
Other	155	685			69

Source: Statistical Abstract of the United States, 1981, Bureau of the Census, U.S. Department of Commerce.

whole (see Table 2). While for "All States" transfers from the federal government accounted for 22% of all general revenue in 1980, federal transfers accounted for only 18% in New Jersey. This translates into $367 per capita revenue from the federal government for "All States," while for New Jersey, that revenue amounts to $309.

Of its own revenue sources, New Jersey derives 80% from taxes, while for "All States", taxes comprise only 75% of all revenues.

Property taxes account for 44% of New Jersey's tax collection, while in the U.S. as a whole, property taxes account for only 31% of revenue from own sources.

There are also differences in the tax composition collected by New Jersey state government compared to "All States." General sales and receipt

TABLE 3
STATE GOVERNMENT TAX COLLECTION BY TYPE 1980

	NEW JERSEY			ALL STATES		
	Mill. Doll.	% of Total	% of Personal Income	Mill. Doll.	% of Total	% of Personal Income
Sales and Gross Receipts	2,092	49.0	2.6	67,885	49.5	3.1
General Sales & Receipts	1,180	27.7	1.5	43,168	31.5	2.0
Motor Fuels	288	6.8	0.4	9,722	7.1	0.3
Alcoholic Beverages	226	5.3	0.3	6,216	4.5	0.3
Other	398	9.3	0.5	8,779	6.4	0.4
Individual Income	1,005	23.6	1.3	37,089	27.1	1.7
Corporate Net Income	497	11.7	0.6	13,321	9.7	0.6
Motor Vehicles	276	6.5	0.3	5,325	3.9	0.2
Other	396	9.3	0.5	13,455	9.8	0.6
Total	4,266	100.0	5.3	137,075	100.0	6.3

Source: Statistical Abstract of the United States, 1981, Bureau of the Census, U.S. Department of Commerce.

taxes account for 27.7% of tax revenues in New Jersey, while for "All States" this percentage is 31.5%.[1] Corporate net income taxes are a substantially larger share of overall tax collection in New Jersey than in "All States." That share is 11.7% for New Jersey and 9.7% for "All States." On the other hand, personal income tax share is 23.6% in New Jersey and 27.1% in "All States" (see Table 3).

Not only did tax revenues grow at a faster rate than the overall income of New Jersey population, but, in addition, recent shifts between federal, state and local expenditures put additional pressures on State fiscal conditions. This is because some expenditures must be maintained even without federal financing. Government expenditures should therefore be viewed with this perspective in mind.

As in the case of revenue, aggregate spending levels do not lend themselves to direct comparisons between states. California's aggregate expenditures cannot be expected to be comparable with that of Vermont. The simplest way to gain more comparability is to eliminate the size effect of population on expenditure. Expressing expenditures on a per capita basis makes interstate comparisons more meaningful.

State per capita expenditures are compared with the averages for the U.S. and the results for New Jersey are presented in Table 4.

TABLE 4
PER CAPITA DIRECT GENERAL EXPENDITURES OF NEW JERSEY STATE AND LOCAL GOVERNMENTS, 1980

(1) Expenditure Categories	(2) New Jersey Expenditures ($)	(3) Average for 48 States ($)	(4) N.J. Compared With U.S. Average (%)
Total Expenditures	1,688	1,589	106.2
1.Local Schools*	503	434	115.9
2.Higher Education	101	160	63.1
3.Public Welfare	208	172	120.9
4.Health and Hospitals	108	132	81.8
5.Highways	106	179	59.2
6.Police and Fire Protection	101	75	134.6
7.Other Expenditures	561	436	128.7

Source: Governmental Finances in 1979-80, Bureau of the Census, U.S. Department of Commerce, 1981.
*Includes expenditures on "other education."

1. After the recent increase in the general sales tax rate from 5% to 6%, the share of this source of revenues will increase.

"Direct Expenditures" are expenditures for a given purpose made directly by state and local governments and do not include transfers of funds from one government level to another. The exclusion of intergovernmental expenditures eliminates so-called "double counting," when state and local government expenditures are added.[2]

"General Expenditures" refer to the fact that expenditures on insurance trusts, unemployment insurance, expenditures on liquor stores and on utilities are excluded. All of these categories have their own separate revenue sources. Some of these expenditures are applicable only to certain states (e.g., not all states own liquor stores or utilities).

"State and Local Government Expenditures" are the sum of expenditures of these two levels of government. We choose to analyze this aggregate because the responsibilities by state or local governments for providing individual services differ from state to state. The implications of differences in responsibilities for providing services is, of course, important and requires a separate investigation.

"Other Expenditures" (row 7) include all expenditures not specified: sewage, housing and urban renewal, natural resources, financial administration, general control administration, public buildings, interest on debt, libraries and other not specified expenditures.

"Total Expenditures" are the sum of all subcategories shown in Table 4.

The results of comparing New Jersey per capita expenditures to the United States average indicate that New Jersey spent 6.2% above the national average for total expenditures and had substantial higher spending on local schools (15.9%), public welfare (29,8%), police and fire protection (34.6%) and on the category of "other expenditures" (28.7%). On the other hand, New Jersey expenditures on higher education, health and hospitals, and highways are below the national averages. It should be pointed out that in the comparison of New Jersey with the "average state" per capita values, we implicitly assume that, except for population, New Jersey conditions are similar to those of an average state and that other conditions affecting spending are unimportant. Therefore, the observed differences in per capita expenditures are attributable to public policies.

While there might be some validity for such assumptions in reference to some states or categories of expenses, such assumption is inappropriate as a general proposition. Therefore, the large inter-category variations in spending apparent in Table 4 warrant a more rigorous analysis of the possible causes for such differences.

II. Analysis of State and Local Expenditures

There is no doubt that differences in per capita expenditure levels may reflect differences in spending attitudes of state and local government. It seems, however, not to be a plausible assumption that subjective factors are the only reason of per capita spending variations among states. Our hypothesis is that a substantial part of differences in per capita expenditures is a result of autonomous factors which do not depend on state and local governments' attitudes. There is, for example, the

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2. For more complete definitions of these and other terms, see Appendix 1.

well-recognized fact that price and wage levels differ among states. Since a large part of state and local governments' expenditures consist of wages and salaries and purchases of services, overall price and wage levels in a given state should affect relative spending levels. To investigate how such autonomous factors may affect state and local per capita spending, we develop a cross-sectional regression analysis using data for 48 states of the continental United States. We seek to explain differences in spending across states as a function of demographic variables and other autonomous economic conditions.

The dependent variable is total direct general expenditures per capita by state and local government in 1980.

In addition to total expenditures, an attempt was also made to explain several subcategories of expenditures resulting in nine expenditure categories (dependent variables).

The dependent variables (all measured on a per capita basis) are: total expenditures (EX1), expenditures on education (PY1), expenditures on public welfare (PY2), expenditures on health and hospitals (PY3), expenditures on highways (PY4), expenditures on police and fire protection (PY5); other expenditures (YMIS), expenditures on local schools and other education (YLS), expenditures on higher education (PY7).[3]

Each of these dependent variables was assumed to be a function of a set of explanatory variables (independent variables). The selection of independent variables followed the general assumption that in each state there exists a set of socio-economic conditions that are relatively independent from any particular policy attitude of the government. For lack of a better term, these variables are called autonomous factors. The same set of independent autonomous variables was used to analyze overall state and local government expenditures and the various expenditures subcategories.

The selected independent variables can be divided into two categories: a) variables that affect the demand for important components of government services, b) variables that affect the cost of delivering these services.

a) Demand Variables:

- Elementary and high school population (EX5) is expected to affect the demand for school and related services. The relationship to expenditures should be positive, i.e., a larger school population is associated with more expenditures on schools. The college-age population (EX1) should determine the demand for higher education and be positively associated with expenditures on public institutions of higher education.

- Population over 65 years of age (X4) is expected to create demand for special services characteristic for this age group. Therefore, the larger the senior citizen population group, the higher government expenditures should be.

- The share of poverty population or its approximation, public aid recipients (EX9), should determine the demand for public welfare and health services financed by state and local governments. The relationship to expenditures should be positive.

- Population growth between 1975 and 1980 (EX6). We hypothesize that population growth may generate demand

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3. For a more detailed description of all variables, see Appendix 2.

for various infrastructure type of programs. New facilities are more expensive on a per capita basis than old facilities. Here, too, we expect the relationship to be positive.

- Per capita personal income (EX8) may generate demand for higher quality services and should be positively related to expenditures.

b) Cost Variables:

- Relative wage levels (EX7). This variable measures the differences in wage levels among states. We assume that these differences are an important determinant of the costs of government services since a large part of public sector costs are wages. Higher relative wage levels should result in higher cost of all or most government services. Thus, the relationship should be positive.

- Metropolitan population share (EX3). This indicator can reflect economies of scale associated with concentration of population. For that reason, the relationship to expenditures was expected to be negative for most service categories.

- Population density (EX2) is supposed to reflect possible economies of scale in cases where higher density is not associated with a higher share of metropolitan population. The sign was expected to be negative.

- The number of government administrative units per million of population (EX19) should, in general, cause higher cost of government services.

Not all independent variables included in all equations were expected to be statistically significant. After the initial calculations, those variables that were insignificant in a particular equation were deleted and the equation reestimated. The results of least square linear equation estimations are shown in Table 5.

As discussed, all demand variables were assumed to be positively related to per capita expenditures and the regression coefficients of these variables have a positive sign in all estimated equations.

A negative sign was, in general, expected for the metropolitan population variable (EX3) and the results are consistent with that expectation. In all equations, except for highway expenditures (equation 5) this variable has a negative sign.

A positive relationship was expected for relative wages (EX7) and the results confirm that expectation in all equations.

The number of government units (EX10) was expected to be positively related to expenditures and this relationship holds in the results for all equations except for health and hospital expenditures (equation 4).

As indicated, we expected a negative sign for coefficients for the density of population indicator (EX2). This expectation was not confirmed.

The results of the regression estimates confirm the notion that a significant portion of the variation in per capita spending among states is determined by autonomous factors, i.e., factors which are essentially not dependent on state and local government attitudes.[4]

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4. The autonomous factors explained 70% variation in per capita expenditures on police and fire protection; 67% of variation in expenses on highways; 57% on public welfare; 55% on other expenditures; 58% on education, but only 22% on health and hospital expenditures and 58% on total expenditures.

Table 5
REGRESSION EQUATIONS OF PER CAPITA EXPENDITURES

	CONSTANT	EX1	EX2	EX3	EX5	EX6	EX7	EX8	EX9	EX10	R^2	F
1. EY1	-4537	12.118	0.0385	-0.2999		0.9969	2.0596	0.1622	3.9434	0.823	0.576	6.627
	(4.390)	(3.054)	(2.105)	(-1.826)		(2.111)	(6.279)	(3.961)	(2.276)	(1.300)		
2. PY1	-1407	6.878	0.0109	-0.1094		0.2627	0.6338	0.0296			0.575	9.242
	(-4.647)	(4.652)	(1.627)	(-1.994)		(1.715)	(5.818)	(2.119)				
3. PY2	-588						0.3539	0.0341	2.3719	0.0232	0.570	14.240
	(-4.613)						(4.926)	(4.178)	(6.871)	(2.592)		
4. PY3	-0.9276	0.9229							0.3412	-0.0192	0.225	4.261
	(-0.009)	(1.276)							(1.357)	(-2.858)		
5. PY4	-148			-0.262			0.2733	0.0281			0.669	29.680
	(-1.460)			(-9.241)			(4.337)	(3.651)				
6. PY5	-238		0.0028	0.0291		0.1065	0.0947	0.0092	0.1931		0.703	16.160
	(-4.273)		(2.230)	(2.612)		(3.442)	(4.101)	(3.143)	(1.646)			
7. YMIS	-1852	2.4298	0.0219			0.5641	0.7169	0.0651	1.3012	0.0612	0.554	7.096
	(-3.974)	(1.327)	(2.7556)			(2.609)	(5.088)	(3.644)	(1.652)	(3.222)		
8. YLS	-731		0.0063	-0.0707	1.4955		0.5638	0.0423			0.495	8.244
	(-2.437)		(1.510)	(-1.674)	(1.755)		(6.149)	(3.522)				
9. PY7	-524	4.3789					0.1013				0.497	22.230
	(-5.059)	(6.404)					(2.317)					

The regression coefficients presented in Table 3 indicate the effect of change in the independent variable on expenditures. In equation 1 the coefficient of EX9 (aid recipients per 1000 population) of 3.94 indicates that an increase by 1 person (per 1000 of population) of aid recipients will increase the estimated value by 3.94 dollars. By the same token, an increase of one dollar of per capita personal income (EX8) will cause an increase by 0.16 of a dollar in the estimated value (in equation 1).

While these relations are informative, it should be understood that they in no way provide a basis for comparing the relative impact of different independent variables on the estimated values. The units of the independent variables differ among themselves and differ also from the units of the dependent variable.

To measure the relative effect of independent variables on the dependent variables, we calculated elasticities to determine the percent of change in expenditures caused by a 1% change in any independent variable (see Table 6).[5] The elasticities of any individual independent variable differ for each equation.

One generalization can, however, be made. The variable reflecting relative wages (EX7) ranks first in effect on expenditures in five out of eight equations and ranks second in the other three equations. A summary of the highest ranking elasticities for each equation is given below.

In equation 1 (total expenditures) the highest elasticity ,1.244, is for relative wages followed by college-age population, 1.02, and income, 0.821. This indicates that, for example, a change of 1% of relative wages (EX7) will result in a 1.24% change in the total per capita expenditures, while a change of 1% in the level of college-age population will result in a change of 1.02% in the level of total expenditures.

In equation 2 estimated expenditures on education show the highest elasticity, 1.549, with respect to college-age population, followed by relative wages, 1.024. Elasticities

Table 6
ELASTICITY COEFFICIENTS

	EX1	EX2	EX3	EX5	EX6	EX7	EX8	EX9	EX10
EY1	1.02	0.038	-0.116		0.678	1.244	0.821	0.141	0.028
PY1	1.549	0.029	-0.113		0.479	1.024	0.400		
PY2						1.975	1.594	0.786	0.072
PY3	0.935							0.147	-0.008
PY4			-0.899			1.466	1.262		
PY5		0.059	0.238		1.536	1.212	0.986	0.147	
YMIS	0.745	0.079			1.399	1.578	1.201	0.170	0.075
YLS		0.023	-0.100	0.731		1.247	0.784		
PY7	3.662					0.608			

5. Elasticities are calculated at the sample means.

with respect to other independent variables are: population growth, 0.479 and personal income, 0.400.

Relative wages have the highest effect on public welfare expenditures (equation 3) ,1.975, followed by personal income, 1.594. The effect of the number of public aid recipients is much lower, 0.786.

In the health and hospitals (equation 4) the elasticity with respect to individual variables is as follows: 0.935 for population 18-24 years, 0.147 for public aid recipients and 0.008 for the number of government units.

The sensitivity of the estimate of highway expenditures (equation 5) to changes in the level of independent variables is the highest for relative wages, elasticity 1.466, for personal income, 1.262, and for metropolitan population, -0.899.

Estimated expenditures on police and fire protection (equation 6) show the highest elasticity (1.536) with respect to population growth, followed by relative wages, 1.212, and personal income, 0.986.

The changes in the level of other expenditures estimated by equation 7 are most sensitive to three independent variables -- relative wages, 1.578, population growth, 1.399 and personal income, 1.201. The elasticity with respect to population density is 0.745 and elasticities of other variables don't exceed 0.2.

The elasticity of local school expenditures (equation 8) is the highest with respect to relative wages, 1.247, and second in importance is the personal income variable with an elasticity of 0.784, followed by school-age population of 0.731.

Equation 9 which is the basis for estimating the higher education expenditures, includes only two independent variables. The elasticity of expenditure in relation to college-age population is 3.662, while the elasticity with respect to relative wage levels is 0.601.

Regression Results and New Jersey Spending

The equations in Table 5 can be solved with the actual New Jersey values of the independent variables, and estimates of New Jersey expenditure levels can be made. These can then be compared to actual New Jersey expenditures (Table 4). Estimations for New Jersey based on the regression equations differ markedly from the average U.S. per capita expenditures for most expenditure cateogories. The estimated values are, in general, substantially closer to actual New Jersey values than are the respective United States averages. This would suggest that the differences between New Jersey per capita spending and U.S. average expenditures are, to a large degree, a result of demographic and economic conditions that influence expenditure levels. These autonomous conditions in New Jersey differ, in most instances, from average U.S. conditions and when the State's conditions are taken into consideration explicitly, actual spending levels in New Jersey are more in line with expenditures in all other 48 states than suggested by the simple comparisons of state averages made in Table 4.

As shown in Table 7, New Jersey's actual per capita total expenditures exceeded the 48-states average by 6.2% (line 10, col. 4). However, actual expenditures in New Jersey are only slightly lower than the estimates of expenditures of the regressions (lines 9 and 10, col. 5) (-2.7% and -0.5%). The results suggest that there is a

Table 7
NEW JERSEY DIRECT GENERAL PER CAPITA EXPENDITURES, ACTUAL AND REGRESSION ESTIMATES

	N.J. Actual $	48 States Mean $	N.J. Estimate $	N.J. Actual/ 48-States Mean (%)	N.J. Actual/ N.J. Estimate (%)
	(1)	(2)	(3)	(4)*	(5)
1. Local Schools**	503	434	487	115.9	103.2
2. Higher Education	101	160	94	63.1	107.4
3. Total Education Expenditures**	604	594	553***	101.7	109.2
4. Public Welfare	208	172	224	120.9	92.9
5. Health & Hospitals	108	132	131	81.8	82.4
6. Highways	106	179	116	59.2	91.4
7. Police & Fire Protection	101	75	108	134.6	94.4
8. Other Expenditures	561	436	575	128.7	97.5
Total					
a. Sum of Categories	1688	1589	1735	106.2	97.3
b. Regression Estimate for Total Expenditures (EY1)	1688	1589	1697	106.2	99.5

*Column (4) of Table 4 for reference.
**Includes expenditures on "other education."
***Regression estimate.

good reason to believe that New Jersey's actual overall per capita expenditures reflect approximately the objective New Jersey conditions which affect spending levels.

New Jersey actual per capita expenditures on local schools and other education exceed by about 16% the 48-state average. A comparison with the regression estimated figure for that category of expenditures suggest that New Jersey's actual spending here is only 3% higher than the regression estimate.

Per capita expenditures on higher education in New Jersey are 6% lower than the respective 48-state average. The regression estimate involving only two independent variables produced an estimate for New Jersey which is relatively close to actual spending (+7%).

The estimated value is in this case strongly affected by the independent variable that reflects the share of the 18-24 year cohort in the State's total population. New Jersey has one of the lowest levels of this indicator in the U.S. — 11.8% vs. 13.4% for the 48-state average. It should be noted that the data of the 18-24 age group are for resident population. The low share of this age group in New Jersey's population is

a result mainly of student emigration to other states. Indeed, when the New Jersey share of college age population (18-24 years) of 11.8% is replaced by the national share of 13.4% (as an approximation for the pre-migration share), the State's expenditures on higher education match the level of expenditures in the U.S. Consequently, the outmigration of college-age population explains New Jersey's low level of higher education expenditures. Whether the level of expenditures per student enrolled in public higher education institutions is sufficient cannot be directly judged from this analysis.[6]

Public welfare expenditures in New Jersey exceed by 21% the average for 48-states. The regression equation for that category of expenditures produced an estimate that is only 7% higher than the actual expenditures. The results here are affected by four factors, three of which have higher levels in New Jersey than the "All States" average. The most important indicator: the number of aid recipients is 30% higher than the average.

The regression equation for health and hospital expenditures involving three independent variables was relatively weak (R^2 = 0.225). For this reason, the estimate of this category is less reliable than estimates of other categories. The estimated value is here close to the U.S. average and the actual spending is about 18% below that estimate.

It should be mentioned that expenditures on health and hospitals comprise 6% of total expenditures and any possible imprecision in the estimate of this category does not substantially affect the estimate of total expenditures.

New Jersey actual per capita expenditures on highways are 41% below the 48-state average. The results of the regression for this category of expenditures suggest that actual expenditures are still below such an estimate but only by 9%.

A comparison of New Jersey spending on police and fire protection with the U.S. average suggests higher spending in New Jersey (+35%). Actual New Jersey expenditures for police and fire protection are, however, about 5% below the value estimated for New Jersey by the regression equation. The regression equation for this category includes six independent variables: population density, share of metropollitan population, population growth, relative wages, adjusted income and public aid recipients.

As was already mentioned, the category other expenditures includes ten different components of expenditures. They were lumped together to limit the number of estimated equations. Each of these expenditures consist of less than 5% of total expenditures, but the sum adds up to 33% of total New Jersey expenditures. Although the composition of this category is highly heterogeneous, six autonomous variables explained a relatively substantial part of variation in per capita expenditures in this category (R^2 = 0.554).

The comparison of New Jersey actual other expenditures to those estimated by the regression equation suggest that the actual are 2.5% below the estimate. That differs markedly from the comparison with the U.S.

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6. For a more detailed discussion of this subject, see Laurence Falk, 14th Annual Report of the Economic Policy Council and Office of Economic Policy, Trenton, 1981.

average since New Jersey's actual expenditures exceed the 48-state average by 29%.

Considering the overall results of regression eatimates for New Jersey, the following comments seem to be in order. Except for expenditures on health and hospitals, substantial differences do not exist between actual expenditures and the expenditures estimated by the regression equations for New Jersey. The relatively low differences between New Jersey actual per capita expenditures and estimated values does not hold when similar estimates are made for other states. A good example is New York State and Pennsylvania where the differences are more precipitous than for New Jersey (see Table 8).

There seem to be at least two possible explanations for the results for New York State. Either the set of explanatory variables left out some autonomous variables that are important in determining New York State expenditures, or New York actual expenditures are heavily affected by non-autonomous factors.

When analyzing expenditures in the light of the estimated values, some general limitations of the regression method should be kept in mind. The most relevant limitation to be recalled here is the fact that regression estimates are still relative values. The estimated values are derived from or based on actual values in other states. If, for example, all or most states spend too little on highways to avert their physical deterioration, the estimated values for individual states will be below levels required to avoid deterioration. This limitation cannot be overcome by improving the statistical quality of the regression equation.

Table 8
ACTUAL AND ESTIMATED PER CAPITA EXPENDITURES:
New York, Pennsylvania
(Actual as Percentage of Estimate)

	New York	Pennsylvania
Local Schools	120	105
Higher Education	134	84
Public Welfare	138	116
Health & Hospitals	143	68
Highways	95	71
Police & Fire Protection	134	84
Other Expenditures	157	109
Total Expenditures	132	98

IV. Summary and Conclusions

During the past decade the tax burden in New Jersey increased substantially. New Jersey state and local government revenues from own sources rose from 11.1% of total State personal income to 13%.

State and local government expenditures can be examined in many ways. In this Chapter, New Jersey per capita expenditures were compared with respective expenditures of all states. Two methods were used: a direct comparison with the U.S. averages for total and several major components of

spending and comparisons with estimates based on regression equations.

The regression equations revealed that a large part of the variation of per capita expenditures can be explained by variables that are relatively independent from government attitudes.

The comaprison with U.S. averages and the regression estimates show different results, especially in relation to individual components of expenditures. The regression estimated values for N.J. are, in general, much closer to actual per capita expenditures than the U.S. averages.

There are no substantial differences between New Jersey's actual expenditures and respective regression estimated values. Substantial differences are, however, noted for some other states.

As in any regression, the estimations are based on actual observations, which in this case are observations for 48 states. If for some reason all or most states neglect some areas of government expenditures or overspend in others, this will be reflected in the regression estimates.

APPENDIX 1

Direct Expenditure

Payment to employees, suppliers, contractors, beneficiaries and other final recipients of governmental payments, i.e., all expenditures other than Intergovernmental Expenditure.

General Expenditure

All government expenditures other than utility expenditure, liquor stores expenditures, and insurance-trust expenditures.

Education

Provision or support of schools and other educational facilities and services. Includes related services.

Local Schools

This category comprises all direct expenditures by local governments for education; other than any direct spending for institutions of higher education; and any direct state government spending for operation of, or facilities and supplies for, elementary and secondary public schools.

Institutions of Higher Education

Includes facilities and activities of all educational institutions beyond the high school level operated by state or local government except that of agricultural experimental stations, agricultural extension services and university-operated hospitals serving the public.

Other Education

Includes State supervision of schools and colleges and state tuition grants, fellowships aid to private schools and educational programs for the handicapped, adults, veterans and other special classes.

Public Welfare

Support of and assistance to needy persons contingent upon their needs. Expenditures under this heading include Cash Assistance Payments directly to needy persons under categorical and other welfare programs; vendor payments made directly to private purveyors for medical care, burials and other services under welfare programs; vendor payments made directly to private welfare programs; services provided directly by the government throughout its hospitals and health agencies are classified under those headings.

Health

Health services, other than hospital care, including health research, clinics, nursing, immunization and other categorical environmental and general public health activities. School health services provided by health agencies are included here.

Highways

Streets, highways and structures necessary for their use, street lighting, snow and ice removal, toll highway and bridge facilities and ferries.

Police Protection

Preservation of law and order and traffic safety. Includes highway police patrols, crime prevention activities, police communications, detention and custody of persons awaiting trial, vehicular inspection.

APPENDIX 2

The dependent variables for which equations were estimated include the following:

EY1 - Total per capita direct general expenditures.

PY1 - Per capita direct general expenditures on education.

PY2 - Per capita direct general expenditures on public welfare.

PY3 - Per capita direct general expenditures on health and hospitals.

PY4 - Per capita direct general expenditures on highways.

PY5 - Per capita direct general expenditures on police and fire protection.

YMIS - All other per capita direct general expenditures not included in items PY2 through PY5. This includes expenditures on sewage, housing and urban renewal, natural resources, financial administration, general control, public buildings, interest and other not specified expenditures.

YLS* - Per capita direct general expenditures on local schools and other education.

PY7* - Per capita direct general expenditures on higher education.

The set of independent variables were:

EX1 - Population 18-24 years of age per 1000 population.

EX2 - Population density. Population per 10 square miles.

EX3 - Metropolitan population per 1000 of total population.

EX4 - Population over 65 years of age per 1000 of total population.

EX5 - Population 5-17 years of age per 1000 of total population.

EX6 - Population growth (population 1980/population 1975) X 1000.

EX7 - Relative wage level. Ratio of State to U.S. wages in the manufacturing sector adjusted for industry composition.

EX8 - Per capita personal income/relative wages index.

EX9 - Public aid recipients per 1000 of total population.

EX10 - Government units 1 per million of total population.

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*YLS and PY7 are subcategories of PY1.

VI
APPENDIX

STATISTICAL TABLES

Table 1

POPULATION AND EMPLOYMENT, NEW JERSEY, 1959 - 1982

Year	Resident Population (000's)	Work/ Labor Force (000's)	Total Employment (000's)	Unemployment Number (000's)	Unemployment Rate (%)	Insured Unemployment Rate (%)
1959	5,960.0	2,483.1	2,303.2	175.5	7.1	5.5
*1960	6,066.8	2,507.4	2,337.2	168.5	6.7	5.7
1961	6,222.2	2,543.5	2,355.9	185.5	7.3	6.0
1962	6,370.7	2,575.1	2,415,0	159.0	6.2	5.2
1963	6,503.2	2,618.4	2,447.9	168.8	6.4	5.4
1964	6,614.6	2,655.5	2,489.6	162.1	6.1	4.8
1965	6,720.3	2,724.5	2,582.2	140.0	5.1	3.9
1966	6,821.1	2,790.3	2,665.3	122.6	4.4	3.2
1967	6,917.5	2,803.0	2,701.0	102.0	3.6	3.4
1968	7,012.8	2,829.0	2,730.0	99.0	3.5	3.3
1969	7,103.3	2,898.0	2,805.0	93.0	3.2	3.3
*1970	7,171.0	2.983.0	2,847.0(r)	137.0	4.6	4.4
1971	7,282.0	3,000.0(r)	2,829.0(r)	171.0	5.7	5.4
1972	7,337.0	3,105.0(r)	2,924.0(r)	181.0(r)	5.8	5.1
1973	7,335.0(r)	3,177.0(r)	2,999.0(r)	179.0(r)	5.6	4.7
1974	7,335.0	3,214.0(r)	3,012.0(r)	203.0(r)	6.3	5.7
1975	7,341.0	3,252.0(r)	2,918.0(r)	333.0(r)	10.2	7.8
1976	7,344.0	3,306.0(r)	2,962.0(r)	345.0(r)	10.4	6.4
1977	7,342.0	3,370.0(r)	3,053.0(r)	317.0(r)	9.4	5.6
1978	7,356.0	3,444.0(r)	3,197.0(r)	247.0(r)	7.2	5.1
1979	7,373.0	3,556.0(r)	3,311.0(r)	246.0(r)	6.9	4.7
*1980	7,365.0(r)	3,582.0	3,323.0	259.0(r)	7.2	4.7
1981	7,421.0	3,587.0	3,325.0	262.0	7.3	
1982	7,438.0	3,624.0	3,299.0	325.0	9.0	

*Population figures for 1960, 1970 and 1980 are April 1 census counts. Estimates for intercensal years are as of July 1, and those estimates from 1971 to 1979 and for 1981 and 1982 are subject to revision.

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

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

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

- Labor force estimates for 1970 to 1980 are obtained directly from the Current Population Survey conducted for the U.S. Department of Labor.

(r) - revised.

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

Table 2

WAGE AND SALARY WORKERS IN NONAGRICULTURAL ESTABLISHMENTS, MAJOR INDUSTRY DIVISIONS, New Jersey, 1950-1982
(in thousands)

Year	Total Non-Agricultural Payroll Employment	Manufacturing	Mining	Contract Construction	Transportation & Public Utilities	Wholesale & Retail Trade	Finance, Insurance & Real Estates	Services and Miscellaneous	Government
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	96.4	154.3	349.1	85.2	222.7	221.2
1958	1,911.8	776.0	3.7	88.9	148.2	351.0	86.4	230.5	227.0
1959	1.970.9	801.9	3.6	96.3	147.0	360.3	86.7	241.6	233.5
1960	2,017.1	808.8	3.5	98.7	149.5	374.5	88.0	252.0	242.1
1961	2,033.6	791.5	3.4	100.0	150.1	380.1	90.6	264.2	253.6
1962	2,095.8	812.8	3.4	101.3	150.8	393.1	92.8	279.9	262.8
1963	2,129.4	809.4	3.5	101.2	151.9	405.3	94.5	291.5	272.1
1964	2,168.7	806.7	3.6	106.8	153.4	420.0	96.6	301.6	280.0
1965	2,259.0	837.5	3.5	110.6	157.0	438.5	98.6	315.6	295.4
1966	2,359.1	879.3	3.0	111.2	162.2	459.6	101.0	330.8	312.0
1967	2,421.5	882.8	2.8	112.2	166.3	472.0	104.7	351.6	329.2
1968	2,485.2	885.3	3.1	115.6	166.3	489.5	108.4	372.6	344.4
1969	2,569.6	892.5	3.3	118.1	176.2	514.9	111.3	393.2	360.1
1970	2,606.2	860.7	3.2	120.4	182.2	538.0	116.5	410.4	374.8
1971	2,607.6	818.3	3.0	117.6	181.1	558.3	120.4	421.0	338.0
1972	2,674.4	823.3	3.2	121.6	181.2	577.3	124.6	437.9	405.3
1973	2,760.8	842.6	3.3	126.8	186.4	596.9	131.0	456.8	417.1
1974	2,783.4	825.9	3.2	118.7	185.8	603.5	136.5	469.9	439.9
1975	2,699.9	747.9	2.8	99.2	174.3	599.3	135.2	471.1	470.2
1976	2,753.7	756.2	2.7	93.9	176.0	618.5	138.0	488.0	480.5
1977	2,836.9	767.3	2.9	94.5	178.2	637.3	142.9	509.8	504.0
1978	2,961.9(r)	786.8	2.6	105.3	188.5	665.9	147.7	542.2(r)	523.0
1979	3,027.2(r)	799.1	2.6	113.7	190.4	678.6	153.9(r)	571.0(r)	517.8(r)
1980	3,060.4(r)	781.0(r)	2.4	111.2(r)	194.5(r)	680.3(r)	158.1(r)	603.1(r)	529.7(r)
1981	3,098.1	770.7	2.3	108.7	196.5	690.6	161.8	638.5	529.0
1982	3,085.2	727.7	2.2	107.2	195.9	698.2	166.7	661.5	525.8

Series have been adjusted to March 1982 benchmarks.
(r) - revised
SOURCE: New Jersey Department of Labor, Division of Planning and Research.

Table 3

WAGE AND SALARY WORKERS IN MANUFACTURING, DURABLE GOODS, NEW JERSEY, 1950-1982
(in thousands)

Year	Total Durable Goods	Lumber & Wood Products	Furniture and Fixtures	Stone, Clay & Glass Products	Primary Metal Industries	Ordnance and Fabricated Metals	Machinery Except Electrical	Electrical Machinery	Trans-portation Equipment	Instru-ments & Related Products	Miscellaneous Manu-facturing Industries
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	412.5	5.6	8.7	31.9	40.9	51.5	57.0	115.0	48.7	27.4	25.8
1959	431.1	5.9	9.2	33.1	41.7	54.3	57.8	121.4	50.5	30.2	27.0
1960	436.8	5.7	9.8	33.7	42.6	54.8	61.0	122.3	48.5	31.7	26.8
1961	421.9	5.6	9.0	34.4	40.7	54.2	57.3	119.5	41.7	31.9	27.6
1962	436.3	5.8	9.7	34.6	40.1	56.1	60.3	125.2	42.5	32.4	29.9
1963	426.0	5.7	8.9	34.9	38.6	55.7	60.1	121.7	39.0	32.9	28.7
1964	419.1	5.6	9.0	35.6	37.9	57.2	61.4	115.1	35.6	31.0	30.7
1965	438.7	5.6	9.4	36.9	39.8	60.8	65.4	118.4	36.8	32.7	32.9
1966	463.4	5.2	10.5	39.3	40.4	64.7	70.8	129.9	36.4	34.3	31.9
1967	464.6	5.0	11.0	39.1	38.6	66.2	75.0	131.1	32.0	36.5	30.0
1968	460.9	5.3	10.2	38.8	38.5	67.5	75.8	127.6	31.7	35.8	29.7
1969	463.3	5.2	11.0	40.9	39.4	69.8	76.2	124.5	31.4	34.7	30.2
1970	434.3	4.9	10.5	39.6	37.2	67.0	72.8	115.2	26.3	33.2	27.5
1971	404.6	4.5	10.6	39.0	35.3	62.9	66.3	104.6	25.3	32.4	25.6
1972	405.9	5.1	10.8	39.9	31.8	63.5	65.8	102.9	25.7	35.1	25.2
1973	420.5	5.3	10.6	40.8	32.0	66.2	72.1	108.1	25.3	34.4	25.9
1974	413.2	5.0	10.3	40.5	31.2	64.4	76.1	105.1	21.1	33.9	25.6
1975	363.1	4.6	8.9	36.0	26.1	58.1	68.4	88.1	19.3	31.2	22.4
1976	363.0	5.3	8.7	36.1	23.9	59.4	67.5	86.8	19.8	31.3	24.0
1977	370.0	5.8	8.9	35.1	23.0	61.1	71.0	87.9	20.7	32.0	24.5
1978	382.8	6.0	10.0	35.2	24.5	64.1	74.2	89.8	20.9	32.3	25.7
1979	395.9	6.7	10.3	35.3	25.5	64.5	76.4	92.9	21.6	35.6	27.1
1980	384.3(r)	5.9(r)	9.7(r)	33.1(r)	25.7(r)	60.8(r)	75.1(r)	92.2(r)	18.5(r)	37.2(r)	26.1(r)
1981	374.2	6.1	9.6	30.9	25.4	58.8	72.5	91.1	17.5	37.1	25.3
1982	347.5	5.7	9.6	26.8	21.6	54.0	66.8	89.1	14.6	35.7	23.6

Series have been adjusted to March 1982 benchmarks.
(r) - revised
SOURCE: New Jersey Department of Labor, Division of Planning and Research.

Table 4

WAGE AND SALARY WORKERS IN MANUFACTURING, NONDURABLE GOODS, NEW JERSEY, 1950-1982

Year	Total Non-durable Goods	Food & Kindred Products	Tobacco Manufactures	Textile Mill Products	Apparel and Related Products	Paper Allied Products	Printing Publishing & Allied Industries	Chemicals & Allied Products	Petroleum, Refining & Related Industries	Rubber & Miscell-aneous Plastic Products	Leather and Leather Products
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	363.6	62.9	1.9	33.0	76.7	28.0	30.3	80.8	12.2	26.6	11.1
1959	370.8	62.3	1.8	33.2	79.2	28.3	31.5	82.4	11.8	29.3	11.1
1960	372.0	62.9	1.7	31.4	77.7	28.0	32.3	86.4	11.5	29.2	11.0
1961	369.6	63.9	1.6	29.1	76.4	28.1	32.6	87.0	11.1	29.2	10.8
1962	376.5	64.2	1.5	28.6	75.8	29.7	33.0	91.0	10.7	30.7	11.5
1963	383.4	64.9	1.4	27.9	74.5	31.4	34.6	94.8	10.5	31.7	11.7
1964	387.6	65.0	1.5	27.8	74.6	31.5	35.8	96.4	9.7	34.2	11.2
1965	398.8	66.4	1.4	28.5	77.3	31.3	37.5	98.9	9.8	36.0	11.5
1966	415.9	67.2	.8	29.6	80.3	33.0	39.6	105.5	10.5	37.2	12.2
1967	418.1	65.3	.6	29.1	78.5	33.7	41.5	110.9	9.6	37.7	11.3
1968	424.5	64.5	.3	30.5	78.7	34.5	42.2	113.1	9.7	39.9	11.5
1969	429.2	63.2	.3	30.8	77.2	35.0	43.3	117.4	10.0	41.4	10.6
1970	426.4	63.5	.3	29.6	72.3	35.3	44.8	120.9	10.1	40.0	9.6
1971	413.7	61.7	.3	29.4	68.9	35.9	43.8	117.5	10.1	36.8	9.4
1972	417.4	59.8	.3	30.5	68.9	35.9	46.0	119.3	10.6	37.2	8.9
1973	422.1	68.7	.2	31.3	68.7	36.8	46.9	124.1	10.9	35.5	9.0
1974	412.7	56.7	.2	28.8	63.1	35.4	47.8	126.6	11.8	34.0	8.4
1975	384.9	53.6	.2	24.5	57.9	32.1	46.4	121.0	12.1	29.3	7.9
1976	393.2	52.7	.2	23.9	61.1	33.2	47.4	122.4	11.9	32.0	8.3
1977	397.3	50.2	.3	22.8	59.7	33.4	49.7	127.2	11.9	34.2	7.9
1978	404.0	49.9	.5	22.4	59.3	33.7	51.7	130.0	11.9	37.3	7.3
1979	403.3	49.5	.4	21.5	56.5	33.9	54.3	129.6	11.9	38.8	6.9
1980	396.8(r)	49.3(r)	.4	20.2(r)	55.7(r)	32.3(r)	55.4(r)	128.2(r)	12.0(r)	37.4(r)	5.9(r)
1981	396.4	48.1	.3	19.0	56.1	31.3	57.7	128.9	11.8	37.3	5.9
1982	380.2	47.2	.3	16.6	50.9	30.0	58.3	124.4	11.2	36.2	5.2

Series have been adjusted to March 1982 benchmarks.
(r) - revised
SOURCE: New Jersey Department of Labor, Division of Planning and Research.

Table 5

EMPLOYMENT, HOURS, AND EARNINGS OF PRODUCTION WORKERS ON MANUFACTURING PAYROLLS, NEW JERSEY, 1947-1982

Year	Employment (thousands)*	Average Weekly Hours**	Average Weekly Earnings (dollars)**	Average Hourly Earnings (dollars)**
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	561.1	40.9	163.35	3.99
1973	582.3	41.4	176.41	4.26
1974	559.8	40.7	186.11	4.57
1975	500.9(r)	39.9	199.68	4.99
1976	509.7(r)	40.4	215.33	5.33
1977	517.2(r)	41.1	239.20	5.82
1978	528.5(r)	40.8	256.22	6.28
1979	530.7(r)	41.2(r)	276.45(r)	6.71(r)
1980	509.9(r)	40.7(r)	297.16(r)	7.31
1981	503.1	40.6	325.95	8.02
1982	461.3	40.2	345.72	8.60

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

*Data have been adjusted to a 182 benchmark.
**Data have been adjusted to 1981 benchmark.

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

Table 6

CONSUMER PRICE INDEXES* FOR URBAN WAGE EARNERS AND CLERICAL WORKERS, 1947-1982
(1967 = 100.0)

Year	United States	New York SCA**	Philadelphia SMSA***
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
1977	181.5	185.5	183.5
1978	195.3	195.4	194.8
1979	217.7	212.8	214.7
1980	247.0	236.8	242.5
1981	272.3	259.9	266.8
1982	288.6	274.1	278.4

*Annual averages.

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

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

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

Table 7

PERSONAL INCOME, NEW JERSEY AND UNITED STATES, 1948-1982

Year	Total Personal Income		Per Capita Personal Income			
	New Jersey (millions of	United States dollars)	New Jersey (current	United States dollars)	New Jersey (1967	United States dollars)
1948	7,800	207,582	1,634	1,421	2,282	1,971
1949	7,879	204,818	1,612	1,378	2,277	1,930
1950	8,685	225,684	1,783	1,492	2,502	2,069
1951	9,883	252,485	1,974	1,647	2,557	2,117
1952	10,681	268,983	2,084	1,728	2,651	2,174
1953	11,479	284,866	2,195	1,800	2,778	2,247
1954	11,688	286,953	2,181	1,781	2,737	2,212
1955	12,434	307,601	2,260	1,872	2,846	2,334
1956	13,494	329,933	2,403	1,972	2,985	2,423
1957	14,349	348,309	2,501	2,044	3,010	2,425
1958	14,559	358,913	2,472	2,061	2,903	2,380
1959	15,675	382,548	2,606	2,160	3,023	2,474
1960	16,502	398,843	2,704	2,216	3,078	2,498
1961	17,281	414,285	2,758	2,264	3,108	2,527
1962	18,537	440,023	2,907	2,369	3,239	2,615
1963	19,461	462,406	2,980	2,454	3,255	2,676
1964	20,858	495,188	3,132	2,592	3,368	2,790
1965	22,472	536,152	3,321	2,772	3,514	2,933
1966	24,320	582,630	3,550	2,980	3,645	3,066
1967	26,183	623,757	3,779	3,161	3,779	3,161
1968	28,740	683,561	4,103	3,430	3,924	3,292
1969	31,252	747,536	4,405	3,714	3,983	3,383
1970	34,061	803,922	4,737	3,945	4,001	3,392
1971	36,527	861,904	5,016	4,167	4,022	3,435
1972	39,469	944,852	5,380	4,515	4,164	3,603
1973	42,906	1,058,902	5,849	5,010	4,251	3,764
1974	46,521	1,162,203	6,342	5,448	4,140	3,689
1975	49,832	1,258,643	6,788	5,842	4,104	3,624
1976	54,082	1,385,201	7,364	6,367	4,224	3,734
1977	58,878	1,534,708	8,019	6,984	4,346	3,848
1978	65,138	1,727,032	8,855	7,776	4,539	3,982
1979	72,196	1,943,983	9,792	8,657	4,581	3,977
1980	80,708	2,154,049	10,941	9,483	4,565	3,839
1981	90,001	2,406,545	12,156	10,495	4,616	3,854
1982	96,898	2,559,904	13,027	11,056	4,716	3,831

Personal income data revised as of May 1983

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

b. The Consumer Price Index (Urban Wage Earners and Clerical Workers) for the United States was used to express United States per capita personal income in constant 1967 dollars.

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

Table 8

PRODUCTION AND TRADE, NEW JERSEY, 1948-1982

Year	Total	Large Industrial and Commercial Users (kilowatt hours	Small Industrial and Commercial Users in thousands)	Value of New Dwelling Units Authorized ($000)	Construction Contracts Awarded ($000)	Retail Stores Sales* ($000,000)	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	n.a.	408,007	n.a.	165,179	23,544
1950	8,023,122	4,161,454	1,630,075	n.a.	747,771	n.a.	210,436	27,229
1951	8,944,201	4,648,835	1,806,808	n.a.	676,458	n.a.	178,862	25,002
1952	9,578,722	4,837,880	1,969,215	n.a.	690,770	n.a.	149,168	19,335
1953	10,435,872	5,191,330	2,180,598	n.a.	793,889	n.a.	208,313	23,048
1954	10,931,039	5,214,694	2,348,391	n.a.	886,947	n.a.	207,242	20,601
1955	12,184,077	5,874,199	2,584,701	n.a.	1,010,459	n.a.	258,079	22,262
1956	13,224,653	6,323,544	2,807,035	n.a.	1,106,452	n.a.	219,297	21,903
1957	14,196,487	6,642,234	3,097,755	n.a.	1,048,449	n.a.	219,865	20,320
1958	14,949,906	6,829,115	3,322,774	n.a.	1,143,484	n.a.	183,770	17,616
1959	16,632,611	7,683,942	3,719,151	n.a.	1,303,736	n.a.	219,305	20,374
1960	17,569,054	8,125,141	3,967,306	497,534	1,256,532	n.a.	266,299	22,532
1961	19,248,349	8,730,727	4,471,379	553,029	1,307,832	n.a.	250,432	24,606
1962	20,630,556	9,506,486	4,848,024	549,825	1,392,618	n.a.	285,955	24,713
1963	22,077,818	10,108,217	5,309,982	608,660	1,534,448	8,992	318,127	26,804
1964	23,848,214	10,773,759	5,872,988	704,809	1,622,048	9,768	325,293	28,417
1965	25,964,004	11,712,402	6,433,961	727,586	1,555,689	10,396	378,768	30,980
1966	28,512,856	12,814,406	7,043,455	588,874	1,651,494	10,711	352,573	31,072
1967	30,146,448	13,147,596	7,620,829	572,646	1,906,577	10,947	302,680	27,471
1968	32,616,153	13,863,329	8,394,581	597,980	2,380,846	12,030	356,762	30,724
1969	35,637,643	15,042,515	9,214,088	562,616	2,205,705	12,582	356,583	34,616
1970	38,156,144	15,394,352	10,185,005	599,034	2,740,746	14,274	348,304	36,027
1971	39,919,508	15,564,483	11,056,580	876,144	2,409,797	15,359	370,004	35,255**
1972	42,318,122	16,192,817	12,143,135	1,062,430	2,948,735	16,399	443,628	50,545
1973	45,540,943	17,018,962	13,233,603	1,030,506	2,513,229	17,874	453,334	53,735
1974	43,995,014	16,390,080	12,904,974	588,291	2,353,822	18,024	351,103	51,663
1975	43,477,908	14,927,694	13,509,510	574,101	1,950,095	19,636	298,926	31,493
1976	45,605,101	15,759,346	14,289,144	832,433	2,063,615	21,833	384,407	45,731
1977	46,398,759	15,659,679	14,744,406	998,931	4,805,407(r)	24,076	448,669	61,578
1978	48,113,001	16,386,752	15,474,339	1,262,831	4,096,430(r)	29,003(r)	436,849	65,772
1979	48,783,424	16,593,515	15,782,667	1,274,353	3,613,237(r)	31,997(r)	402,484	63,867
1980	49,585,000(r)	16,345,000(r)	16,446,000(r)	1,010,084	3,789,979(r)	34,274(r)	396,150	56,390
1981	49,400,000	16,283,000	16,741,000	1,022,130	3,568,772	35,976	327,051	39,093
1982	p49,145,000	p15,207,000	p17,803,000	n.a.	3,687,640	37,584	305,568	38,649

*Data prior to 1976 are based on different sample design and arenot strictly comparable with later retail sales figures.
**Years 1948-70 compiled by N.J. Auto List. Years 1972-82 are from the N.J. Division of Motor Vehicles.
p - preliminary estimates (r) - revised n.a. - not available
SOURCES: Electric Power Sales: Edison Electric Institute and U.S. Department of Energy. New Dwelling Units Authorized: New Jersey Department of Labor in cooperation with U.S. Department of Commerce. Construction Contracts Awarded: F.W. Dodge Corporation. Retail Sales: U.S. Department of Commerce. Registration of NewVehicles: New Jersey Auto Lists, Inc.; N.J. Division of Motor Vehicles.
Prepared by: New Jersey Department of Labor, Division of Planning and Research.

Table 9

BUSINESS ACTIVITY, NEW JERSEY, 1948-1982

Year	Business Telephones Net Gains	Business Failures (Number)	Liabilities Business Failures ($000)	New Incorporations (Number)	New Jersey Turnpike Toll Revenue ($000)	New Jersey Turnpike Number of Vehicles (000)
1948	19,106	219	15,286	5,510	n.a.	n.a.
1949	10,014	366	16,646	5,411	n.a.	n.a.
1950	20,134	346	10,926	6,009	n.a.	n.a.
1951	29,806	307	11,961	5,581	n.a.	n.a.
1952	29,044	319	18,627	6,146	16,241	17,948
1953	26,613	360	25,856	6,651	19,193	22,005
1954	24,664	385	20,086	7,276	20,756	24,555
1955	31,659	456	29,753	8,386	21,123	25,888
1956	37,452	582	33,919	8,839	24,513(r)	31,588
1957	29,856	565	39,604	8,097	29,023(r)	39,270
1958	21,892	778	43,475	8,757	30,159(r)	41,615
1959	35,051	639	27,619	10,436	33,318(r)	46,199
1960	38,543	714	49,071	10,172	35,584(r)	49,083
1961	28,825	717	53,282	9,650	37,193(r)	51,738
1962	39,383	591	58,468	9,984	39,240(r)	54,901
1963	29,716	509	256,075	9,716	40,779(r)	56,677
1964	36,771	442	49,261	10,023	44,149(r)	60,708
1965	47,251	512	96,334	10,439	46,122(r)	64,958
1966	54,650	442	61,191	9,656	48,610(r)	69,850
1967	48,620	414	64,215	10,220	51,230(r)	73,529
1968	53,293	423	42,692	12,038	55,340(r)	78,205
1969	73,211	343	53,141	13,168	57,637(r)	80,618
1970	58,787	463	142,196	13,958	63,934(r)	89,655
1971	45,401	428	102,738	15,563	70,124(r)	98,553
1972	66,989	453	173,428	16,462	75,940(r)	107,933
1973	87,064	491	201,463	16,312	78,997(r)	110,422
1974	55,327	643	110,441	15,410	75,243(r)	106,628
1975	31,164	768	213,209	16,022	84,385(r)	105,633
1976	53,040	660	174,457	18,270	91,082(r)	109,234
1977	76,351	535	194,995	19,366	95,112	113,664
1978	73,114	415	198,834	20,381	100,838	120,623
1979	67,957	421	194,188	21,172	100,885(r)	121,031
1980	69,040	430	182,709	21,484	118,614(r)	122,588
1981	76,340	521	372,568	24,113	126,188	127,212
1982	29,839	n.a.	n.a.	22,401	129,922	132,932

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

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

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

Table 10

AGRICULTURE, NEW JERSEY, 1950-1981

Year	Number of Workers on Farms (thousands)	Cash Receipts from Farm Marketings (thousands of $) Total	From Livestock and Products	From Crops
1950	66	292,430	188,694	103,736
1951	65	348,831	229,976	118,855
1952	61	342,447	215,156	127,291
1953	58	346,187	223,750	122,437
1954	59	314,259	194,605	119,654
1955	58	307,674	200,178	107,496
1956	53	330,372	202,117	128,255
1957	51	314,627	193,991	120,636
1958	51	304,569	191,946	112,623
1959	45	288,814	170.273	118,541
1960	44	296,510	166,126	130,384
1961	42	285,007	154,547	130,460
1962	41	276,598	143,854	132,744
1963	39	267,965	134,962	133,003
1964	37	259,477	124,079	135,398
1965	33	268,493	118,031	150,462
1966	27	269,839	120,262	149,577
1967	23	250,927	102,337	148,590
1968	23	252,599	100,797	151,802
1969	21	248,982	103,694	145,288
1970	20	246,631	98,962	147,669
1971	19	244,045	90,679	153,366
1972	20	240,784	90,910	149,874
1973	19	302,035	111,204	190,831
1974	20	339,876	113,269	226,607
1975	21	325,998	102,915	223,083
1976	22	335,534	109,599	225,935
1977	23	348,793	98,237	250,556
1978	23	398,555	121,370	277.185
1979	20	413,732	127,632	286,100
1980	21	434,575	123,457	311,118
1981 (P)	n.a.	459,310	106,229	353.081

(P) - Preliminary estimates.

SOURCES: U.S. Department of Agricutlure; N.J. Department of Agriculture.

Prepared by N.J.Department of Agriculture.

Table 11

RESIDENT POPULATION FOR NEW JERSEY COUNTIES
1970, 1980

County	Census April 1, 1970	April 1, 1980
Atlantic	175,043	194,119
Bergen	897,148	845,385
Burlington	323,132	362,542
Camden	456,291	471,650
Cape May	59,554	82,266
Cumberland	121,374	132,866
Essex	932,526	851,304(r)
Gloucester	172,681	199,917
Hudson	607,839	556,972
Hunterdon	69,718	87,361
Mercer	304,116	307,863
Middlesex	583,813	595,893
Monmouth	461,849	503,173
Morris	383,454	407,630
Ocean	208,470	346,038
Passaic	460,782	447,585
Salem	60,346	64,676
Somerset	198,372	203,129
Sussex	77,528	116,119
Union	543,116	504,094
Warren	73,960	84,429
STATE TOTAL	7,171,112	7,365,011(r)

(r) - revised

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

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