CHANGES IN RECREATION ORIENTED TRAVEL IN THE NORTHEAST BETWEEN 1972 and 1977[1]

Gerald L. Cole[2]

Abstract.--Data from the National Travel Surveys of 1972 and 1977 are utilized in a modified shift-share approach to compare Northeastern travel with other regions of the U.S. The Northeast is losing relative to other regions when travel is compared using 1972 as the base year. However, travel with camping equipment increased in the Northeast relative to the other regions.

INTRODUCTION

One of the sub-objectives of the NE-100 regional research project at Northeast Agricultural Experiment Stations has been to utilize secondary data sources as a means of detecting changes in trends in outdoor recreation participation. This paper focuses on the National Travel Surveys conducted in 1972 and 1977 by the U. S. Department of Commerce.

Data tapes for both surveys were released to research personnel at the University of Vermont, enabling a comparison between the two survey years. For the households sampled, all travel for trips of 100 miles or more from home was recorded by purpose of the trip, mode of travel and origin and destination of the trip. Also, person trips (number of trips x number of persons) and person nights (person trips x number of nights away from home) were included.

This paper was developed because of some hypothesized changes occurring in the Northeast region which could affect the recreation-tourism sector. It may be useful to outline some factors associated with travel and then elaborate on some hypotheses concerning the region. Variables which affect the demand for travel include population, income, education and family size. On the supply side, the natural resource base for tourist attractions, highway availability and condition, together with technological advances, will also be important.

It is hypothesized that the demand for travel in the Northeast will slow because of slower population growth compared to other regions of the U.S. Pennsylvania, New York, Rhode Island and the District of Columbia are estimated to have population decreases between 1970 and 1977. While incomes have continued to increase in the region, price increases for some consumer goods have outstripped income growth. This is especially true for gasoline prices which have risen sufficiently to cause a reduction in fuel used between 1979 and 1980. It is hypothesized that higher fuel prices will reduce the demand for travel not only for persons originating their trip in the Northeast region, but especially for those from outside the region.

Continued increases in the level of education and the trend towards smaller households (including one person households) should spur an increased demand for travel which may partially offset the negative effects of reduced population growth and higher fuel prices.

On the supply side, it is hypothesized that those natural resource attractions which are within 100-150 miles of important population centers will have an advantage over more remote areas. To illustrate, the Delaware, Maryland and New Jersey shores together with Cape Cod, will be in a better relative position than attractions in Northern New England.

New technological developments which promote more fuel efficient recreation vehicles, outboard engines, etc. can also stimulate participation in camping and boating.

---

[1]Paper presented at the National Outdoor Recreation Trends Symposium, Durham, NH, April 20-23, 1980.

[2]Associate Professor, Dept. of Agricultural and Food Economics, University of DE, Newark. The valuable assistance from Malcolm I. Bevins and Jed Guertin, University of VT, is greatly appreciated. Bevins presented a preliminary analysis of some of the possible uses of the National Travel Survey Data at a NE-100 research meeting. Guertin provided computer programming assistance.

OBJECTIVE

The objective of this paper is to utilize the travel data from the two survey years in order to indicate shifts in the shares of travel and other related factors by state, region - Mid-Atlantic, New York-New Jersey, and New England - and the Northeast between 1972 and 1977, compared to other regions and the U.S. Shifts in travel market shares will be compared with population growth shares for the same states, regions and the U.S.

PROCEDURE

A modification of shift-share analysis will be used to measure changes in the state and regional travel share compared to the U.S.

Shift-share analysis is a technique for measuring factors which relate to differences in growth rates among regions. The technique was developed by Dunn who states:

> "Regional development takes place in a national framework and depends in part upon forces operating at the national level. As output and income grow, the demand for different commodities grows at different rates. Likewise, on the supply side, technological change leads to differential shifts. The impact of changes at the national level affects regions in different ways because of differences in the composition of their output." [3]

In this paper, the number of person nights of travel in 1972 and 1977 by state of destination will be used as the variable to measure shifts. It is argued that person nights provide the best available measure of economic impact because both the number of persons in the travel party and the number of nights spent on the trip are recorded.

An analysis of other state and regional travel data utilizing SPSS provides additional indicators of growth or decline in the travel market within the region.

RESULTS

<u>Population growth and shift-share</u>

It is well known that population growth in the Northeast has not kept pace with other regions since 1970. While U.S. population increased 6.4 percent between 1970 and 1977, the Northeast region's population increased only by 1.4 percent, Table 1. The Northeast region in this study includes 13 states and the District of Columbia.[4] Population grew fastest in the South and in the Northwest.

A shift-share analysis of population compares not only the percentage increase, but also the 1970 base population in each of the states and regions. In order to calculate what will be called the Population Share Index Value, the following formula is used:

$$\begin{matrix}\text{Population} \\ \text{Share Index} \\ \text{Value}\end{matrix} = \left[\begin{matrix}\text{Base population} \\ \text{for state or} \\ \text{region (1970)}\end{matrix}\right]$$

$$\left[\begin{matrix}\text{Percentage change in} \\ \text{state or regional pop-} \\ \text{ulation from 1970-77}\end{matrix} \quad - \quad \begin{matrix}\text{Percentage change} \\ \text{in U.S. popula-} \\ \text{tion from 1970-77}\end{matrix}\right]$$

Table 1. Population growth for the United States, by region, and for Northeastern states between 1970 and 1977.[a]

Region	1970	1977	Percent change
	- - (000) - -		
U.S.	203,806	216,332	6.4
New England	11,883	12,242	3.3
ME	997	1,085	9.2
NH	742	849	15.0
VT	446	485	8.7
MA	5,706	5,782	1.6
RI	951	935	-1.6
CT	3,041	3,108	2.5
NY-NJ	25,461	25,253	-0.8
NY	18,268	17,924	-1.7
NJ	7,193	7,329	2.2
Mid-Atlantic	23,468	24,190	3.1
DE	551	582	6.1
DC	756	690	-8.8
MD	3,938	4,139	5.5
PA	11,813	11,785	-0.1
VA	4,659	5,135	10.4
WV	1,751	1,859	6.6
Northeast	60,812	61,685	1.4
South	37,573	41,803	11.2
North Central	46,960	47,911	2.0
Northwest	7,097	7,957	12.1
Southwest	23,555	26,254	11.4
Pacific	27,811	30,722	10.5

a/ Source: U. S. Department of Commerce, <u>Statistical Abstract of the United States - 1978</u>, pp. 14-15.

[3] Dunn, Edgar S., Jr., "A Statistical and Analytical Technique for Regional Analysis," The Regional Science Assoc., <u>Papers and Proceedings</u>, Vol. VI (1960).

[4] Some of the names of travel regions were changed in 1977 compared to the 1972 National Travel Survey. In this paper, the 1972 names will be used. See Appendix A for the definitions of travel regions.

The result of these calculations is shown in Figure 1. The position of each state or region on the bar chart is based on (1) the size of the 1970 population, and (2) whether the state or regional percentage population change between 1970 and 1977 was greater or less than the U.S. change. Thus, if the state or region had a population change which exactly coincided with the U.S. change, the index value would equal zero, i.e. would be on the base line. If the regional change was greater than the U.S. change, the index value would be positive and conversely, if the regional change was less than the U.S. change, the value would be negative.

The Northeast region shows the greatest negative index value and the Southern region the greatest positive value. Regions also showing a negative share index include North Central, New York-New Jersey, Mid-Atlantic and New England. The Northeast value is a composite of the New York-New Jersey, Mid-Atlantic and New England regions.

On the positive side of the base line, in addition to the Southern region, are the Northwest, Pacific and Southwest regions. While the Northwest region had the largest percentage population growth between 1970 and 1977, the smallest base population of any of the regions resulted in a smaller positive index value.

Among the individual states in the Northeast, only five grew at a faster rate than the U.S. and exhibited positive values. Only Virginia among the five had a population over one million. Therefore, the values do not deviate significantly from the base line.

On the negative side, Pennsylvania and New York, the two most populated states in the Northeast, both lost population between 1970 and 1977. The combined effect of population loss in New York, Pennsylvania, Rhode Island and the District of Columbia, together with population growth at less than the national rate in seven other Northeastern states, generated the negative Northeast index value.

The bar chart provides a measure of relative growth and decline in state and regional population shares between 1970 and 1977. Population growth or decline is one of the most important variables affecting travel in the regions.

Person nights of travel and shift-share

Using the same procedure as for the population analysis, state and regional growth in person nights of travel is indicated in Table 2. Data for the smaller states were not published in 1972. Therefore, a state comparison for Connecticut, Rhode Island, New Hampshire, Vermont and Maine is not possible. However, data for the New England Region are available. While the number of person nights of travel increased 26 percent nationally between

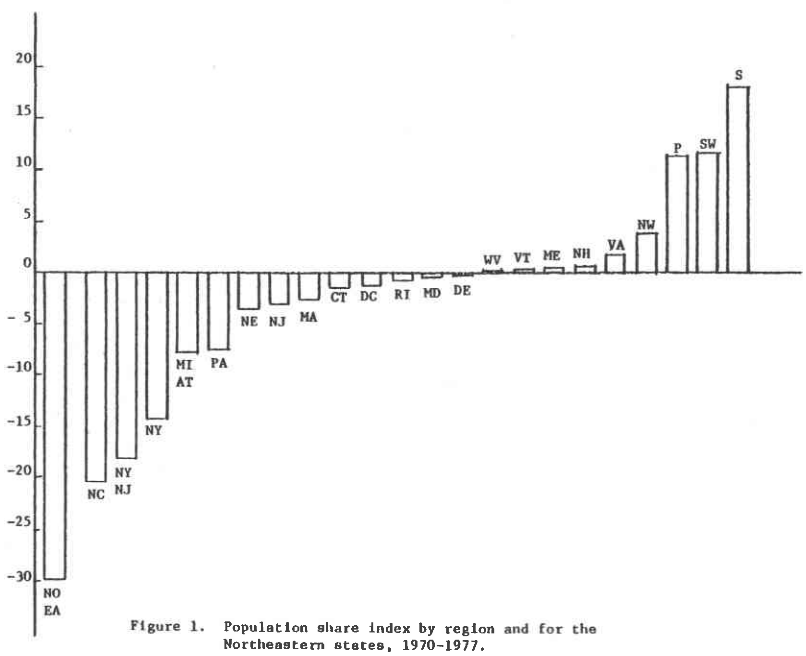

Figure 1. Population share index by region and for the Northeastern states, 1970-1977.

1972 and 1977, the increase in the Northeast was only 15.9 percent and the New England states registered a smaller 5.5 percent increase. Within the Northeast, person nights of travel actually decreased by 8.3 percent in Pennsylvania.

Table 2. Person nights of travel for the United States, by region, 1972-1977.a/

Region	1972	1977	Percent change
	- (000,000) -		
United States	1,906.0	2,367.3	26.0
New England	97.0	102.3	5.5
NY-NJ	101.1	120.3	19.0
Mid-Atlantic	137.6	166.4	20.9
Northeast	335.7	389.0	15.9
South	385.2	501.5	30.2
North Central	278.7	354.0	27.0
Northwest	91.6	118.3	29.1
Southwest	207.0	290.1	40.1
Pacific	272.1	325.4	19.6

a/ Source: U. S. Department of Commerce, Bureau of the Census, 1972 and 1977 National Travel Surveys.

In other regions, the Southwest exhibited a 40.1 percent increase followed by the South and the Northwest.

Within the Mid-Atlantic states, increased travel to the District of Columbia and Virginia exceeded the national increase.

A shift-share analysis of person nights of travel by destination state or region is presented in Figure 2. The formula for computing what will be called the Travel Share Index Value is as follows:

$$\text{Travel Share Index Value} = \left[\begin{array}{l}\text{Base person nights}\\ \text{of travel for state}\\ \text{or region (1972)}\end{array}\right] \left[\begin{array}{l}\text{Percentage change}\\ \text{in state or re-}\\ \text{gional person}\\ \text{nights of travel}\\ \text{from 1972-77}\end{array} - \begin{array}{l}\text{Percentage change}\\ \text{in national person}\\ \text{nights of travel}\\ \text{from 1972-77}\end{array}\right]$$

Again combining the magnitude of the base year travel with the percentage deviation from the National increase, the largest negative value is obtained for the Northeast region and the greatest positive value for the Southwest. If travel had changed from the base year by region in the same relative proportion as population growth, the ranking of states and regions would be the same as in Figure 1. However, this is not the case. For the travel index, the Southwest gained relative to the South when compared to population index. The value for the Pacific region is negative, while the population value was positive.

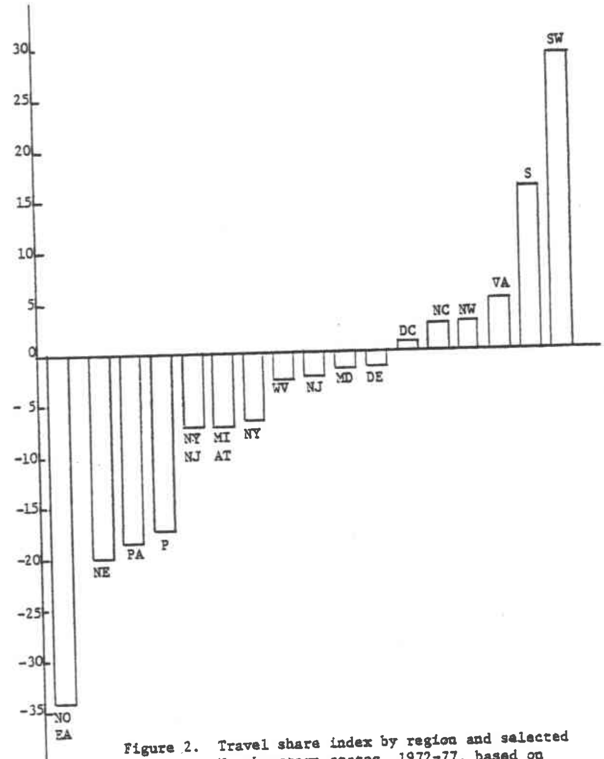

Figure 2. Travel share index by region and selected Northeastern states, 1972-77, based on person nights of travel by destination.

Within the region, only the District of Columbia and Virginia exhibit positive travel index values. Clearly the New England states, New York-New Jersey and the Mid-Atlantic states are losing relative to national growth. The North Central region is the only other region to show a negative value.

Not all states or regions have matched population growth with growth in travel. A causal relationship cannot be established from a shift-share analysis. Only a descriptive analysis of the changes is possible. The description can serve as an indicator of a need for further investigation of the reasons for variation in travel. It is clear that the Northeast is losing relative to other regions except for the Pacific region. Because the regional and state patterns of travel growth are not the same as the patterns of population growth, it is evident that more than the population variable is affecting travel. This suggests the need for additional investigation of supply variables and other demand variables in the states or regions most affected, i.e., those which deviate from the base time. For example, are the historical-governmental attractions in the D. C.-Virginia area serving as a major attractant? Are the attractions in Pennsylvania such as Gettysburg, the Amish Country or the Poconos, losing favor? Are the natural resource attractions in Northern New England too far from population centers?

Camping travel shift-share

One indicator of the intent of travelers is whether or not they travel with camping equipment. In the National Travel Survey, trips by personal vehicle with and without camping equipment are recorded. Nationally, person nights of travel with camping equipment is a relatively small part of total travel. The proportion of travel with camping equipment varies from three percent in the New York-New Jersey region to 17 percent in the Northwest.

The increase in person nights of travel with camping equipment across the U.S. was quite modest - 3.6 percent - between 1972 and 1977, Table 3. Regionally, a much different pattern emerges than was the case with all travel. The New England and Mid-Atlantic regions showed substantial percentage increases in camper travel with smaller increases in the South and Southwest. Major declines were noted in the Pacific and New York-New Jersey regions with smaller decreases in the North Central and Northwest regions.

Table 3. Person nights of travel with personal auto/truck and camping equipment, by region, 1972-1977.a/

Region	Person nights of travel 1972	1977	Percent change
	- - (000) - -		
United States	160,244	165,990	3.6
New England	7,075	9,678	36.8
NY-NJ	4,564	3,756	-17.7
Mid-Atlantic	8,751	12,596	43.9
Northeast	20,390	26,030	27.7
South	31,971	37,674	17.8
North Central	22,354	21,170	-5.3
Northwest	20,819	19,714	-5.3
Southwest	23,570	28,581	21.3
Pacific	41,140	32,821	-20.2

a/ Source: U. S. Department of Commerce, Bureau of the Census, 1972 and 1977 National Travel Survey.

Using the same procedure as with population and total travel, a Camper Travel Index Value is computed as follows:

$$\text{Camper Travel Index Value} = \left[\begin{array}{l}\text{Person nights of}\\ \text{travel with camping}\\ \text{equipment in base}\\ \text{year (1972)}\end{array}\right] \left[\begin{array}{l}\text{Percentage change}\\ \text{in state or region.}\\ \text{person nights with}\\ \text{camp. equip. from}\\ \text{1972-77}\end{array} - \begin{array}{l}\text{Percentage change}\\ \text{in national person}\\ \text{nights of travel}\\ \text{with camp. equip.}\\ \text{from 1972-77}\end{array}\right]$$

In this instance, the greatest negative value is generated for the Pacific region and the greatest positive value for the Northeast, Figure 3. The Pacific region had the largest amount of travel in the base year and the greatest percentage declines. The positive effect of the large percentage increases in New England and the Mid-Atlantic region relative to the U.S. were the major factors in generating a large positive index value. Thus, even though the Northeast has lost population relative to the U.S. and total person nights of travel have decreased compared to the National rate of change, camper travel has increased.

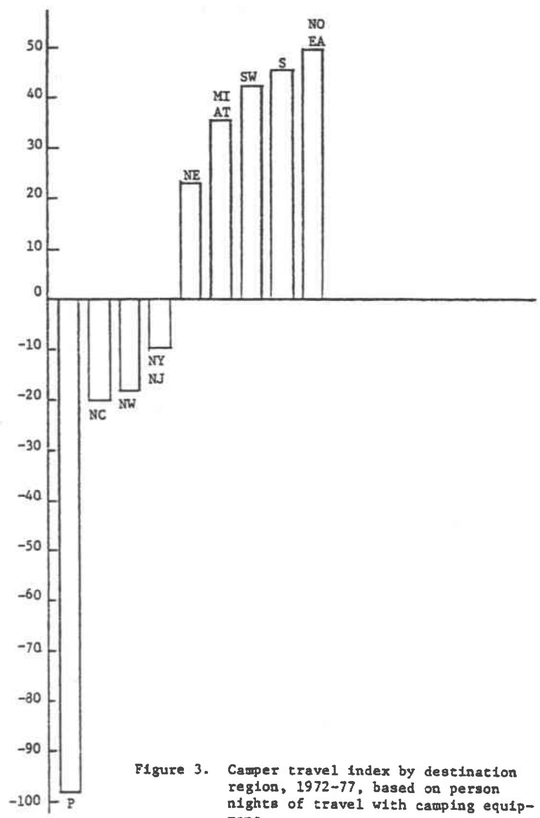

Figure 3. Camper travel index by destination region, 1972-77, based on person nights of travel with camping equipment.

Unfortunately, the lack of the data for the New England states in 1972 (except for Massachusetts) makes a comparison of individual states within the region and nation impossible. Data will be available in future census years, however.

Other comparisons from travel survey data

Numerous comparisons are possible using the National Travel Survey from 1972 and 1977. Selected comparisons follow as examples of possible analyses.

Origin - destination analysis of travelers

For marketing of recreation-tourism services it is essential to know the origin of travelers in order to better pinpoint advertising efforts and to be able to forecast possible impacts due to projected changes in population growth, fuel costs, etc.

An analysis of the origin of travelers to the Northeast (New England-New York-New Jersey and Mid-Atlantic regions) will serve as an example of the type of information that can be generated. Data for Connecticut are illustrated in Table 4.

Table 4. Origin of trips to Connecticut, by region, and selected states, 1972 and 1977.

Origin (Region or state)	Percent of trips 1972	1977
New England	37.4	42.2
NY-NJ	33.4	31.6
Mid-Atlantic	14.8	9.8
Sub-total	85.6	83.6
South	4.8	6.8
North Central	5.2	6.5
Northwest	.2	.2
Southwest	1.6	.7
Pacific	2.4	2.0
Total	100.0	100.0
Major States -		
MA	23.2	31.3
NY	22.8	13.3
NJ	10.6	18.3
RI	6.4	5.0
PA	5.6	5.8
MD	4.0	1.0
	71.6	74.7

In Northern New England, over 90 percent of all trips to Vermont, New Hampshirre and Maine originate in the Northeast and the share from within the region increased for Vermont and New Hampshire between 1972 and 1977. As indicated earlier, the population growth in the Northeast is slower than elsewhere in the U.S. and/or is generated in states with a small population base. If higher fuel costs further deter travel from more distant regions, this has an important potential negative impact on Northern New England. Some impact is already being felt since the total number of trips to Vermont and Maine decreased between 1972 and 1977.

Southern New England (Connecticut, Massachusetts and Rhode Island) is only slightly less dependent on the Northeast for its' travelers. The share for all three states is between 80 and 90 percent. However, Massachusetts, the most populated state, suffered a 22 percent decline in the number of trips between 1972 and 1977. The fact that Southern New England draws a slightly greater share of travelers from outside the Northeast can provide a negative impact as fuel costs escalate.

In the New York-New Jersey region, New York's dependence on the Northeast region increased between 1972 and 1977 primarily due to a decline in travelers from the North Central region. Both New York and New Jersey had 80 percent of their travelers originating in the region in 1977.

New Jersey's proportion of visitors from the Southern region nearly doubled but the proportion from the North Central region was cut in half. This could be due to travel distances. One might further speculate about future impacts in New Jersey with the present and expanding availability of casino gambling in Atlantic City. This can attract travelers from greater distances, particularly by public transportation.

Among the Mid-Atlantic states in the southern part of the Northeast, only Delaware depends on the Northeast for over 90 percent of the travelers coming into the state. An increasing proportion of the travelers came from the Southern region to the Mid-Atlantic states between 1972 and 1977. This was especially true for Virginia and West Virginia. A declining share of travelers came from the North Central region. West Virginia was most dependent on the North Central states.

The Southern states in the Mid-Atlantic region, being closer to the Southern region, may expect a positive impact from increasing population provided that rising fuel costs don't completely offset the effect of population.

While the entire Northeast region will likely be adversely affected by low or zero population growth among some of the states in the region, there will likely be states in the southern part of the region that may expect to enjoy future growth in the travel market largely generated from the South. Continued monitoring of the county employment and expenditure data from other sources will better establish a causal relationship.

Purpose of trip

In the Northeast region, with the exception of Southern New England, there was a slight upward trend in the proportion of trips made for outdoor recreation, entertainment and sightseeing purposes, i.e. non-business and non-family related travel. Recreation, entertainment and sightseeing travel as a group accounted for 20-30 percent of total travel for the region with a gain of approximately two percentage points between 1972 and 1977.

Mode of transportation

There was a slight down trend in the use of private vehicles for travel. Even though New England is more dependent than the remainder of the Northeast on private transportation, the private share decreased from 85 to 82 percent between 1972 and 1977. Elsewhere in the region the private share declined from 76 to 71 percent. Thus, public transportation is making a slight gain. It will be interesting to continue to monitor the trend as fuel prices escalate.

Number of persons per trip

There was a tendency for the proportion of one person trips to increase between 1972 and 1977. This probably reflects the National trend in formation of one-person households. However, if the trend continues it has implications for the lodging and restaurant industries, among others. In 1977, slightly over 50 percent of the trips in the region were taken by individuals.

Type of lodging

There was an increase in the proportion of commercial lodging (hotels, motels and campgrounds) used as well as stays with friends and relatives. Therefore, the use of the travelers own lodging (second homes, etc.) declined.

Distance traveled

Between 1972 and 1977, there was an increased proportion of travel for round trips of 400 miles or less and conversely the share of longer trips diminished. By 1977, slightly over 50 percent of the trips taken were for the shorter distances and slightly less than half for distances over 400 miles.

Limitations

Analyses of National Travel Survey data are subject to certain limitations. The Travel Survey only includes trips which are 100 miles or more each way. Therefore, a major portion of trips by travelers in New England or individual small states, such as Delaware, may go unreported. This would be especially true for travel to resource based attractions - mountains, lakes or seashores - which are relatively close to the traveler's home. The Travel Survey reports fewer trips per capita taken by New England residents compared to those residing in other regions, Table 5. Part of the discrepancy may be due to the exclusion of shorter trips.

Table 5. Trips per capita and per traveling person, by region, and for the U.S., 1977.a/

Region	Trips per Capita	Trips per traveling person
New England	1.9	3.4
NY-NJ	1.7	3.4
Mid-Atlantic	2.2	3.8
South	2.4	3.8
North Central	2.7	4.0
Northwest	3.8	4.8
Southwest	3.1	4.4
Pacific	2.8	4.1
United States	2.5	4.0

a/ Source: U. S. Department of Commerce, Bureau of the Census, 1977 National Travel Survey.

If there is a trend towards taking shorter trips, the under-reporting problem may increase. A lowering of the minimum trip length may be warranted in future travel surveys.

The impact of Canadian travel to the U.S., particularly Northern New England, also cannot be measured. Thus, if the number of Canadian travelers is increasing over time this may partially offset the negative effect of fewer American travelers.

SUMMARY AND CONCLUSIONS

The major purpose of this paper was to demonstrate the use of National Travel Survey data for 1972 and 1977 in a modified shift-share analysis of travel in the Northeastern states together with population growth between 1970 and 1977. Additional comparisons of travel data also were made to detect possible trends or changes in travel patterns.

The Northeast had the greatest negative population share index compared to other regions and the U.S. Four Northeast states lost population between 1970 and 1977.

Low or negative population growth influenced person nights of travel in the region between 1972 and 1977. Consequently, the Northeast also had the greatest negative travel share index value. Other regions of the U.S. lost out as a travel destination relative to the National pattern, also. For example, the Pacific region had a negative index value as well. A camper travel index using person nights of travel with camping equipment was generated. In this instance the Northeast had the largest positive index value, because camper travel increased relative to the U.S. and other regions.

The Northeast tends to be highly dependent on persons residing within the region as the source of travelers. Continued slow or non-existent population growth in the region will have the effect of limiting the growth in demand for travel, especially when the impact of rising fuel costs is considered.

Other trends noted include a slight increase in: (1) the proportion of trips taken for entertainment purposes, (2) the use of public transportation, (3) the use of commercial lodging, and (4) the tendency to take shorter trips of less than 200 miles one way.

The analysis has developed some possible indicators of change in travel in the Northeastern U.S. It will be necessary to examine other secondary sources at the county level or to collect primary data to provide the causes of the changes noted.

LITERATURE CITED

Dunn, Edgar S., Jr. 1960. A statistical and analytical technique for regional analysis. Papers and proceedings, Vol. 6, The Regional Science Assoc.

U. S. Department of Commerce. Bureau of the Census. 1972 and 1977. National travel survey, Census of Transportation.

U. S. Department of Commerce. 1978. Statistical abstract of the United States.

Appendix A. Travel Regions of the 1972 National Travel Survey