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Dynamic Social and Economic Effects of the Connecticut Turnpike

Annette M. Gaegler and James W. March, Office of Program and Policy Planning, Federal Highway Administration
Paul Weiner, Department of Economics, University of Connecticut

This paper summarizes the findings of a study of the long-term social and economic impacts of the Connecticut Turnpike on the eastern Connecticut region. Data developed in a 1965 report, The Connecticut Turnpike—A Ribbon of Hope, were updated and the dynamics of change in the highway corridor were investigated. Changes in population, manufacturing employment, retail sales, and assessed property values were related to increases in accessibility afforded by the Connecticut Turnpike and were compared for towns adjacent to the turnpike and for control towns in the eastern Connecticut region that were not located on the turnpike. Findings from the study indicate that the Connecticut Turnpike has had a continuing influence on the level and distribution of population and economic activity in the eastern Connecticut region. During the first 6

years the turnpike was in operation, only the eastern Connecticut towns located directly on the turnpike grew faster in population than the state as a whole. Since then, towns throughout the entire eastern Connecticut region have grown faster than the rest of the state. Although increases in population were widespread throughout the region, increases in manufacturing employment, retail sales, and land values were concentrated in towns along the turnpike. Moreover, among the turnpike towns significant differences in impact were found. The study concludes that the Connecticut Turnpike has had a significant long-term impact on the eastern Connecticut region, but that not all towns in the region have shared equally in that growth.

Highways are usually constructed in response to increased traffic demands associated with economic development. The Connecticut Turnpike, however, was constructed primarily to stimulate development in eastern Connecticut, an area that had become economically depressed following the demise of the textile industry in the northeastern United States. The textile industry had dominated the economy of eastern Connecticut until the 1950s when the textile mills began to move south. Large pockets of unemployment developed, wages fell below the state average, and there were extended seasonal layoffs. Attempts to attract new industries were not successful. In 1957, the Connecticut General Assembly authorized the construction of the Connecticut Turnpike in an attempt to stimulate the region's economic growth. A research project, undertaken by the University of Connecticut in cooperation with the Connecticut State Highway Department and the U.S. Bureau of Public Roads, measured the impact of the new facility on the economy of eastern Connecticut in the years following the opening of the turnpike.

The final report of that project, entitled The Connecticut Turnpike: A Ribbon of Hope (1), made several conclusions about the effects of the Connecticut Turnpike on persons and businesses in the region. This study found that towns along the Connecticut Turnpike had relatively greater economic growth than either control towns in the region or other towns around the state. It also found that the turnpike had reversed the sentiment of eastern Connecticut's inhabitants from one of pessimism to optimism. They perceived the Connecticut Turnpike as enhancing the economic development of the region, particularly after its prior downward trend.

The turnpike also improved both intraregional and interregional accessibility, making existing job opportunities more accessible and stimulating creation of additional jobs, particularly those in manufacturing. The study found that labor-market areas for firms within the region became more elliptical following construction of the turnpike; the major axis generally followed the turnpike. The accessibility afforded by the turnpike thus affected the firms' labor-market areas. Workers were able to commute from greater distances; but the longer the commute, the nearer the employee lived to the highway.

Differences were found in the rate of economic development among the turnpike towns. It was hypothesized that these relative differences were the result of each community's capacity to respond to the potential economic stimulus of a major infrastructure investment such as a highway. The study concluded that the benefits of a new transportation facility can be enhanced if construction of the facility is planned and coordinated with other local development initiatives.

The Ribbon-of-Hope study contained data from 1957 through 1963. Since the Connecticut Turnpike was opened in January 1958, the study could only analyze the short-term socioeconomic effects of the highway. The report noted that "the full impact of the Connecticut Turnpike . . . will not be known for several years" (1, p. 5). This paper reports on a study conducted by Paul Weiner of the University of Connecticut for the Federal Highway Administration to update data in the original study and to assess the long-term social and economic impacts of the Connecticut Turnpike (2).

SCOPE AND OBJECTIVES

The overall objective of this study was to analyze the long-term social and economic impacts of the Connecticut Turnpike on the eastern Connecticut region. The Connecticut Turnpike was chosen because it is one of the few major highway projects constructed primarily to stimulate economic growth and development. The Connecticut Turnpike is divided, for purposes of this study, into two sections—the section designated CT-52, which goes from the Rhode Island border to the junction with I-95, and the section of I-95 from the Connecticut River, which is the western edge of the study area, to CT-52 (Figure 1). Because the eastern portion of I-95 was anticipated to have an impact on the area as well as the Connecticut Turnpike portion of the highway, it was included in the study.

Impact indicators chosen for the study were changes in population, employment, retail sales, and property values in eastern Connecticut towns over a 15- to 20-year period. Two groups of towns were analyzed—23 turnpike towns within 8 km (5 miles) of the turnpike or I-95, and 13 control towns not adjacent to either of these two highways. The two groups are the same as those used in the earlier Ribbon-of-Hope study. Because the earlier study found that the effect of the turnpike on different communities in eastern Connecticut was not uniform, the Weiner study examines the 23 turnpike towns in greater detail. Three groups of turnpike towns are analyzed—those bordering CT-52, those bordering I-95 (including the nonturnpike portion), and three of the larger cities in the region—Groton, New London, and Norwich. Grouping the towns in this manner was expected to enhance the analysis of the differences in the degree and timing of social and economic change in the region and to assist in identifying whether or not there are specific actions that towns can take to enhance the development potential created by major highway improvements.

IMPROVED ACCESSIBILITY AND ECONOMIC DEVELOPMENT

The link between highway improvements and economic development is improved accessibility. Reduced travel time and transport costs contribute to economic development by expanding the markets for both goods and labor. Businesses benefit by being able to transport factors of production and finished products more safely, cheaply, and reliably and by being able to draw on a larger labor market. Workers in the region benefit by having a greater number of job opportunities accessible to them, particularly when new businesses are attracted to the region because of improved accessibility.

To measure the increase in accessibility provided by the Connecticut Turnpike and I-95, an accessibility index was constructed for towns in the eastern Connecticut region. The index focused on accessibility to employment and may be calculated as follows:

$$A_i = \Sigma E_j \cdot 1/F_{ij} \quad (1)$$

where

A_i = accessibility index for town i,
E_j = employment in town j, and

F_{ij} = travel time in minutes between towns i and j.

This accessibility index measures only intraregional accessibility and, thus, is insufficient to explain location decisions of firms moving into the region. However, it does provide a measure of the relative accessibility benefits afforded turnpike and control towns by the Connecticut Turnpike and helps explain changes in population, retail sales, and property values among eastern Connecticut towns.

Table 1 compares the aggregate accessibility index values for turnpike and control towns before and after CT-52 and I-95 were opened. Even without CT-52 and I-95, the turnpike towns enjoyed greater accessibility to employment than control towns within the region. Construction of the turnpike increased the locational advantage of the turnpike towns relative to the control towns, but even the control towns realized benefits from the turnpike with respect to accessibility-to-employment opportunities. Among the turnpike towns, the new highway produced the greatest increase in the accessibility index for the three large cities followed by the towns along I-95. In towns along the CT-52 section of the turnpike, the increase in accessibility to employment was only slightly greater than that for the average of all control towns.

Table 2 relates changes in employment accessibility among turnpike and control towns in eastern Connecticut to changes in employment, manufacturing employment and wages, population, retail sales, and grand lists (assessed property values). These variables all increased faster in turnpike towns than in control towns, and among turnpike towns those located along I-95 performed better than those along CT-52, reflecting the greater increase in accessibility among I-95 towns.

Figure 1. Eastern Connecticut study area.

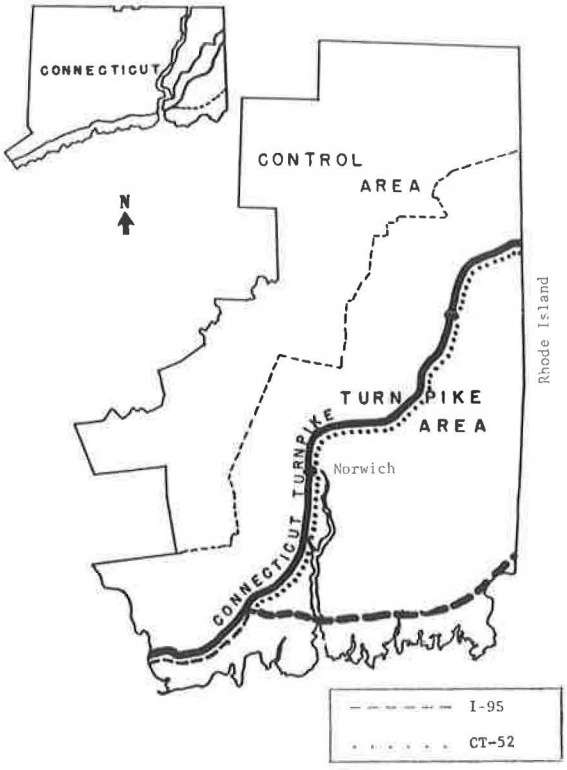

Table 1. Changes in accessibility following construction of the Connecticut Turnpike.

Area	Accessibility Index Values		Change (%)
	Without I-95 and CT-52	With I-95 and CT-52	
Control towns	37 815	39 002	3.1
Turnpike towns	69 576	78 076	12.2
I-95 towns	47 524	62 383	31.3
CT-52 towns	44 915	47 276	5.3
3 cities	130 267	246 100	88.9

MANUFACTURING EMPLOYMENT

Because the Connecticut Turnpike was constructed primarily to stimulate the declining economy of eastern Connecticut, the change in manufacturing employment in the region is a good indicator of the performance and effectiveness of the turnpike. Table 3 shows percentage changes in manufacturing employment in turnpike towns, control towns, the eastern Connecticut region, and the state for selected years between 1954 and 1975.

In the 4-year period before the turnpike was opened to traffic, the region showed a slight decline in manufacturing employment, but this decline was not as great as experienced by the state as a whole. The towns that were to be located along the turnpike fared better than other towns in the region; they showed a slight increase in manufacturing employment even before the turnpike opened. In the 4-year period after the turnpike was completed, manufacturing employment recovered; the state had a 9.2 percent increase in manufacturing employment and the eastern Connecticut region showed a 20.2 percent increase. Turnpike towns in the region again performed better than control towns, but the control towns showed a remarkable recovery with a 15.5 percent increase as compared to a 7.3 percent decline during the previous 4-year period. Long-term impacts of the Connecticut Turnpike on manufacturing employment are reflected in the relative rates of growth between 1962 and 1975. Although manufacturing employment in the entire state declined by almost 6 percent, manufacturing employment in towns located along the turnpike increased by 14.2 percent. Manufacturing employment in the eastern Connecticut region increased

Table 2. Percentage changes in socioeconomic characteristics of turnpike and control towns.

Area	Socioeconomic Characteristics						
	Accessibility	Employment (1960-1970)	Manufacturing Workers (Nontextile, 1958-1975)	Manufacturing Wages (Nontextile, 1958-1975)	Population (1960-1974)	Retail Sales (1962-1974)	Grand Lists (1958-1974)
Control towns	3.1	27.6	10.9	126.7	21.1	93.5	180.6
Turnpike towns	12.2	43.2	60.7	233.7	29.9	126.4	357.9
I-95 towns	31.3	68.9	-	-	63.0	171.9	640.7
CT-52 towns	5.3	25.9	-	-	38.7	140.0	370.1
3 cities	88.9	37.0	-	-	8.8	103.8	189.3

by 8 percent, but in the control towns in the region it declined by almost 20 percent. For manufacturing, which is heavily dependent on good transportation, the benefits of the turnpike thus accrued predominantly to towns closest to the turnpike.

POPULATION

Another important indicator of the effect of the Connecticut Turnpike on the development of the eastern Connecticut region is population. Population changes are, of course, related to changes in manufacturing employment, but also reflect changes in secondary employment generated by manufacturing employment. Furthermore, because the turnpike increases accessibility within the region, it allows greater freedom of residential choice for persons working in the region. Even though they may work in a large manufacturing town, persons preferring to live in smaller towns may more easily do so. Thus, although a close correlation would be expected between regional changes in employment and population, this correlation does not hold on a town-by-town basis.

Table 4 shows that before construction of the turnpike the eastern Connecticut region was growing slower than the state as a whole. The towns that were to become turnpike towns were growing faster than other towns in the region, but not as fast as the rest of the state. During the first 6 years the turnpike was open to traffic, the eastern region grew faster than the state as a whole, with the fastest rate of population increase occurring in the turnpike towns. From 1964 to 1970 the control towns grew faster than the turnpike towns, and both groups in the eastern Connecticut region grew faster than the state. During this period, the rate of population increase accelerated from the rate for the previous period for the group of control towns. However, the rate of population growth declined from the previous period in the turnpike towns, the region, and the state as a whole. Between 1970 and 1974, the state population grew only 0.72 percent/year compared to 1.01 percent/year for turnpike towns and 1.35 percent/year for control towns.

While the population growth rate of control towns has exceeded that for all turnpike towns since 1964, if the three cities of Groton, New London, and Norwich are removed from the turnpike group, the growth rate for the turnpike towns exceeds that for the control towns. As have many older industrial cities, Groton, New London, and Norwich have recently suffered declining economies that require more than highway improvements to reverse.

The turnpike thus appears to have had two major long-term impacts on population in the eastern Connecticut region. First, it has stimulated total population in the region to a growth rate exceeding that of the state as a whole. Second, it has allowed greater choice in residential location for those living in the region. The population growth rate in the control towns has been rising faster than manufacturing employment, and the same is true for the turnpike towns along CT-52. The growth rate in manufacturing employment has been fastest in the I-95 turnpike towns, but all towns in the region with the exception of the three large cities have attracted new residents. Table 5 supports this conclusion. It shows that net migration to the control towns and CT-52 towns has been significantly greater than to the I-95 towns. It appears that many persons, because of good intraregional accessibility, are choosing to live in the smaller control towns and CT-52 towns while working in the larger manufacturing towns along I-95.

Table 3. Percentage change in manufacturing employment, 1954-1975.

Area	1954-1958	1958-1962	1962-1975	1958-1975
Control towns	-17.3	15.5	-19.7	-7.3
Turnpike towns	4.3	21.3	14.2	38.5
Region	-0.6	20.2	8.0	29.8
State	-8.2	9.2	-5.8	2.8

Table 4. Annual percentage change in population, 1950-1974.

Area	1950-1958	1958-1964	1964-1970	1970-1974
Turnpike towns	2.14	2.50	2.10	1.01
Control towns	1.37	1.71	2.18	1.35
Region	1.98	2.34	2.13	1.06
State	2.57	2.04	1.49	0.72
I-95 towns	-	3.20	4.01	1.59
CT-52 towns	-	1.82	2.56	1.68
3 cities	-	0.88	0.51	0.02

Table 5. Net migration for control towns, turnpike towns, and the state, 1950-1970.

Area	1950-1960	1960-1970	Change (%)
State	233 000	215 019	-7.7
Control towns	951	6 474	680.7
Turnpike towns	15 553	18 035	16.0
I-95 towns	13 300	19 700	48.1
CT-52 towns	1 300	9 300	715.4
3 cities	-2 300	-7 100	-208.7

OTHER INDICATORS OF ECONOMIC IMPACT

Several other factors were examined in this study to assess the economic impact of the Connecticut Turnpike. Changes in retail sales, grand lists (assessed property values), building-lot values, and house values are shown in Table 6.

Retail sales data are somewhat difficult to interpret. Before the turnpike was constructed, sales in the turnpike towns were increasing faster than in the control towns. However, in the first four years after the turnpike was opened, sales in the control towns grew faster than sales in the towns adjacent to the turnpike. Possible explanations for this are that the control towns were building upon a smaller base or that there was a lag time before retailing in the turnpike towns realized its potential. Since 1962, however, retail sales in the turnpike towns have grown much more rapidly than in the control towns, reflecting the accessibility advan-

Table 6. Percentage changes in grand lists, building-lot values, and house values for control towns and turnpike towns, 1954-1974.

Area	Grand Lists			Building Lot Values	House Values
	1958-1968	1968-1974	1958-1974	1958-1973	1958-1973
Control towns	52.4	84.2	180.6	209.9	85.9
Turnpike towns	123.4	99.7	357.9	336.2	94.5
I-95 towns	184.4	160.5	640.7	510.5	110.6
CT-52 towns	121.5	112.2	370.1	224.8	75.9
3 cities	98.0	46.1	189.3	248.4	94.4

tages that the turnpike towns realized. Even the three cities that grew very little in population experienced significant increases in retail sales.

Grand lists, building-lot values, and average house values are also generally higher in towns with greater accessibility. In all three categories, the turnpike towns show greater percentage increases than control towns, and I-95 towns show the greatest increases within this group. Data on the grand lists indicate that the short-term impacts of the turnpike on property values were much greater for turnpike than control towns. In the long run, however, the turnpike has increased property values throughout the region. Between 1968 and 1974 the grand lists in control towns rose almost as fast as those in the turnpike towns, demonstrating the ripple effect major highways can have on towns located some distance away.

CONCLUSION

Some 13 years after the 1965 Ribbon-of-Hope study, the socioeconomic effects of the Connecticut Turnpike continue to be significant. Except for retail sales, the short-term impacts examined in the 1965 study were concentrated in the towns along the turnpike. In the long run, some of the impacts have spread throughout the region. Manufacturing employment has remained concentrated in the turnpike towns, reflecting the interregional accessibility afforded by the turnpike. Impacts on nonmanufacturing employment, population, retail sales, and property values appear to have spread over time to the control towns within the region, reflecting the improved intraregional accessibility that allows persons to live in one town but to work or shop in another. The benefits of the turnpike remain greater in the turnpike towns, but not all turnpike towns have shared equally in these benefits. Generally, those towns along I-95 have benefited more than those along CT-52. The I-95 towns were growing faster than towns along CT-52, even before the turnpike was constructed. In addition, the improved accessibility provided by the turnpike reinforced their economic and locational advantages.

Thus, it appears that the economic impacts of highways are dynamic and continue to influence the level and distribution of economic activity over a long period of time. The impacts of highways on towns within a corridor are not uniform, however, and depend to a large extent on past trends, future potential, and the present actions that the town takes to exploit the development potential offered by a new highway.

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Abridgment

Rural Road-Closure Planning Program to Preserve Agricultural Land

William C. Hartwig, Michigan Department of Transportation

A dominant feature of counties in rural Michigan is the grid of roads. Except if interrupted or diverted to accommodate natural features, the road pattern generally runs north to south and east to west. The regularity and intensity of the pattern are significant. The grid usually conforms to 1.6-km (1-mile) spacing. An occasional major route will appear as a diagonal, but even these tend to be part of the 1.6-km (1-mile) grid.

The regularity and density of the road network evolved after much debate in the U.S. Congress, which enacted the Ordinance of 1785 (1, p. 161). This act established townships and the 1.6-km (1-mile) survey grid. From this evolved the 1.6-km grid of section line roads. The act's objective was to open up the land for settlement and various other uses.

The United States had vast tracts of undeveloped land suitable for farming. Early accessibility was provided by waterways; however, vast areas were unreachable without very difficult travel. Roads were needed to open up the area. The issue that confronts the country today, 200 years later, is whether or not the objective of opening up the countryside is still valid. Today the U.S. road network may be a double-edged sword for the farmer; i.e., it provides good accessibility but also facilitates the spread of urbanization.

Some impacts of the 1.6-km (1-mile) grid on the farmer, the county road commission, and providers of public services are discussed here. One impact of urbanization is illustrated by the change in the number of farms by size category. From 1969 to 1974, farms under 19.6 hm^2 (49 acres) have increased by 9 percent; farms of more than 200 hm^2 (500 acres) have increased by 31 percent. However, farms in the 20- to 199-hm^2 (50- to 499-acre) category have decreased by 20 percent (2, p. 148). Thus, some midsized farms are being split into smaller units, while others are being accumulated into units of more than 200 hm^2 (500 acres).

Putting together large contiguous agricultural production areas is inhibited by a dense road network. Therefore, crossing or traveling a road to go from one field