



The Economic Impact of the Mashantucket Pequot Tribal Nation Operations on Connecticut

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EXECUTIVE SUMMARY

With its diverse business enterprises and reinvestments of capital in Connecticut, the Mashantucket Pequot Tribal Nation has become an economic growth marvel for the State and the immediate region.

Since the opening of its Foxwoods Resort Casino in 1992, the Nation has created almost 13,000 jobs and played a leading role in revitalizing the southeastern Connecticut economy of the early 1990s that absorbed large defense spending cutbacks.

However, the full economic impact of the Nation, its Foxwoods Resort Casino and other business enterprises is far greater than just direct employment effects.

Using a sophisticated computer model of the Connecticut economy and other economic analyses, the University of Connecticut's Center for Economic Analysis has found that the Tribal Nation's investments in people, goods and services, capital improvements and private land has had significant, positive economic impacts on the State. Regional Economic Models, Inc. (REMI) of Amherst, MA develops the computer model of the Connecticut economy.

The Center has found that:

- ❖ The Tribal Nation has raised real gross state product (GSP) by \$1.2 billion dollars on average above the baseline forecast annually over the study period due to the presence of its operations. This represents a yearly average percentage increase of 8.5% for New London's gross regional product and 1% for the State's GSP.
- ❖ The Nation has increased total (direct, indirect and induced) employment statewide by 41,363 jobs on average yearly above the status quo forecast.

Table 1 below summarizes these findings.

Table 1. Summary Table for the Economic Impact of MPTN Operations.

Numbers represent annual average differences from the baseline forecast of the New London and Connecticut economies.

	<i>New London County</i>		<i>Connecticut</i>	
	<i>Level change</i>	<i>Percent change</i>	<i>Level change</i>	<i>Percent change</i>
GRP	805 Mil 92\$	8.54%	1,228 Mil 92\$	0.89%
Employment	31,358	17.83%	41,363	1.80%
Personal Income	1,145 Mil Nom \$	10.15%	1,913 Mil Nom \$	1.01%

Note: GRP is gross regional product, the region being either a county or the State.

In addition to these impressive numbers, the Mashantucket Pequot Tribal Nation (MPTN) operations:

- ❖ Have sustained positive residential property values in Ledyard, North Stonington and Preston relative to the Hartford Labor Market Area in a period when substantial cutbacks in employment in New London County occurred.
- ❖ Have seventy-three percent of visitors to Foxwoods Resort Casino from other states, whose spending is net new to the region. This spending stimulates the expansion of the lodging and restaurant business in the area.
- ❖ Have provided millions of dollars in property tax money to the Towns of Norwich, Preston, North Stonington and Ledyard.
- ❖ Have assumed a leadership role in welfare reform, including lifting families out of poverty through training and employment through its Work ETC program.
- ❖ Passed on revenues from slot operations to the State that topped \$1 billion in January 2000. These revenues are distributed in turn to the 169 towns in Connecticut.

- ❖ Developed high-speed ferry operations that connect New London with Glen Cove, NY and Martha's Vineyard, and will intersect the nation's first high-speed train, Acela, in New London.
- ❖ Built a \$193 million Native American Museum that is a leading cultural attraction in the area. The Tribal Nation also sponsors an annual tribal pow-wow, Schemitzun that brings cultural tourists to the area. Cultural tourists stay longer and spend more money than other tourists.

Any large economic development has positive and negative impacts. This report looks at traffic congestion and reported crimes in the area as negative impacts. We studied a 15-mile strip of Route 2 and examined crime statistics for the area towns and found that overall, traffic and crime associated with the business enterprises had small negative impacts on the economic growth of the region and the State.

This report describes in detail the economic and fiscal impacts of the Mashantucket Pequot Tribal Nation operations on Connecticut and New London County.

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Introduction

The economic success of the Mashantucket Pequot Tribal Nation has helped both the immediate region of southeastern Connecticut and the entire State.

Before the opening of Foxwoods Resort Casino in 1992, eastern Connecticut was primarily a rural area with low economic activity with the exception of two or three major pockets of industry, including the defense industry. The needs of the Mashantucket Pequot Tribal members – the State’s poorest group, according to the 1990 census – were persistently ignored by the State government (Bee, 1990).

In the early 1990s, the region faced a crisis with a contraction in the defense industry, as well as a downsizing in general manufacturing. From 1988 to 1993, the region lost approximately 10,000 jobs, including nearly 4,800 manufacturing jobs (Hsu, 1999). In 1993, projections for 1998 were even worse: 25 percent unemployment with 32,000 jobs lost (Dyer, 1997). Changes in laws, a unique geographical location between two major metropolitan areas, a heroic effort from the Tribal leadership, and greater acceptance by the American people toward gaming, created an excellent opportunity for the Mashantucket Pequots to run one of the most successful casinos in the U.S. (d’Hauteserre, 1998).

The opening of the Tribal Nation’s Foxwoods Resort Casino brought in thousands of jobs much needed in the region. The resort alone employs 12,934 people, both full- and part-time, and 9,757 are Connecticut residents. In addition, since 1993, the State of Connecticut receives 25 percent of gross slot machine revenues, which amounted to \$174 million in 1999. By January 2000, the cumulative slot machine revenue from the Tribal Nation to the state topped \$1 billion.

In addition to the slot machine revenue, the Tribe pays directly to the state the costs for regulating its gaming enterprises by the state police, the Division of Special

Revenue and the Department of Consumer Protection. The Tribal Nation's regulatory fee payments to the state now total more than \$5 million per year.

Impact on tourism

Foxwoods Resort Casino hosts nearly 41,000 people per day on average, with 73 percent of the customers coming from out-of-state.¹ This high tourism rate has a significant effect on the region's lodging and dining businesses because tourists buy gas, souvenirs, meals, and lodging in the region. Tourists are attracted not only by gaming opportunities but also by a variety of entertainment (concerts, nightclubs, boxing) and restaurants. The construction of modern hotel facilities on the reservation has also helped develop a growing conference and convention business in the area.

In addition, the Tribe in 1998 completed the Mashantucket Pequot Museum and Indian Research Center, which preserves tribal history and helps educate the general public about Indian history and culture. The Museum now attracts more than 250,000 people per year, making it one of the most popular museums in the State. The Museum's programs supplement K-12 art and history programs and preserve Native American culture for the general public. Coupled with other cultural and tourist attractions in the region, the Museum captures tourist dollars that otherwise would flow out of state.

The Tribal Nation every year sponsors the annual Schemitzun festival, a celebration of Native American music, dance and culture, which attracts from 20,000 to 60,000 people over a four-day weekend. The visitors include members of indigenous tribes from North and South America.

Understanding the broad, diverse impact of tourism, the Tribe has also purchased off-reservation tourism properties, including the Hilton Mystic in Mystic, the Spa at Norwich Inn in Norwich, and Randall's Ordinary in North Stonington. The spa is one of

¹ The data on tourism and spending patterns is from the survey prepared by the Impact Strategies, Inc. in 1999-2000 (see Appendix 4).

the most famous spas in the United States, and in purchasing the property the Tribe has restored it to financial success and expanded it with a recent capital project.

Beyond tourism

The Tribe's direct contribution to the region's economy is not limited to gaming- and tourism-related businesses. In 1990, the Tribal Nation created the nationwide pharmaceutical business, Pequot Pharmaceutical Network (PRxN), which in 1999 had total gross revenues of \$18.9 million.

The Tribe's welfare-to-work program, Work ETC (Work, Education, Transportation and Childcare) is a unique program that addresses the vital needs of people on welfare who are seeing a new job or a return to the workforce. The Mashantucket Pequot Tribal Nation was the first employer in the state to play such an integral part in the support of a complete welfare-to-work program by offering financial support, administrative and government support and, most importantly, entry-level positions that were suitable to the participants. Since its inception in 1997, the program has trained and employed more than 150 people. These results reduce state transfer payments, generate tax revenue and induce new spending for consumer goods.

Finally, the total economic impact of the Tribal Nation goes far beyond the direct impact of its business operations. The study by Wright and Associates (1993), using economic base analysis, found that every Foxwoods job supports 1.107 additional non-casino jobs elsewhere in New London County, plus 0.74 new jobs in the rest of Connecticut. The Center for Economic Analysis' report employs an alternative economic model, which allows estimation of the dynamic economic impact of the Tribe's operations and is more detailed in its analysis of inter-industry linkages and population movement.

We considered direct impact economic variables described in this report (such as employment and procurement) and estimated their indirect and induced effects by using

the widely accepted REMI model. Considering that every economic activity imposes indirect costs or benefits on others, we capture amenity aspects (such as education, congestion, cultural preservation) of the Nation's enterprises in the model to calculate the total benefits and costs of MPTN operations.

The results of our analysis argue that the Mashantucket Pequot Tribal Nation plays a major role in the regional economy, contributing 41,000 jobs to the State, with 31,000 of those in New London County, generating \$1.2 billion in Gross State Product, and adding \$1.9 billion to the State's aggregate personal income. Of these amounts, New London County captures \$800 million in GRP and \$1.1 billion in personal income.

Economic Impact Analysis

The MPTN Foxwoods Resort Casino operations have not only had a direct impact on the economy of New London County and the State of Connecticut, but also significant indirect and induced economic effects. To get at the extent of these effects the Connecticut Center for Economic Analysis (CCEA) uses a microcomputer-based economic model of the Connecticut economy developed by Regional Economic Models, Inc. (REMI) of Amherst, MA. The REMI econometric model is a sophisticated 53-sector replication of the state's economic structure that can project economic impacts out to the year 2035.² We limit our analysis only to the State of Connecticut and, therefore, ignore the economic impact of the MPTN on the economies of Rhode Island and Massachusetts. Moreover, because the data from which the model is constructed are available only at the county level, the analysis can not directly separate out the economic impacts on town level. However, we used other alternative economic procedures to estimate the effects of MPTN operations on three neighboring towns of Ledyard, Preston and North Stonington (see Appendix 2).

Methodology and the Data

The analysis relies on a counterfactual approach to estimate the impact of the Mashantucket Pequot Tribal Nation's operations since the establishment of Foxwoods Resort Casino. The model considers only the expenditure side of all transactions in order to avoid double counting. The analysis presented here looks at the dynamic economic effects up to the year 2019 of the hypothetical removal of Foxwoods Resort Casino and consequent reductions in all related businesses starting in the year 2000. The objective is to determine the net benefits of the MPTN Foxwoods Resort Casino related operations to

² The detailed description of the REMI model can be found in Appendix 1 of this report.

New London County and the entire State, in terms of increased employment, population, gross regional product and personal income.

The Mashantucket Pequot Tribal Nation provided the data for employment and spending of the Casino and its related businesses, property taxes paid to neighboring towns and the description of the Work ETC program. The Division of Special Revenue regularly releases the data on transfers to the State of Connecticut. Finally, tourist visiting and spending patterns have been obtained through a comprehensive survey conducted by Impact Strategies, Inc. in 1999 - 2000.³

The basic data for MPTN operations are as follows:

Foxwoods Resort Casino data (fiscal year 1999 figures):

- Employs 12,934 people, of whom 9,757 are from Connecticut (7,845 from New London County).
- Purchases necessary for the operation of the Casino accounted for more than \$252 million (\$106.5 million from Connecticut, \$44 million of which are from New London County).
- All employees of the MPTN are covered by comprehensive health insurance, with total gross payments to health care providers totaling \$54 million for 1999.

Mashantucket Pequot Museum data (fiscal year 1999 figures):

- Attracted 256,217 visitors of whom 42% came exclusively to the museum.
- Total revenues were \$844,000.
- Cost of goods sold accounted for \$143,000.

Off-reservation hotels and tourism data (1999 figures):

- Pequot Hotel Group employs 797 people with 258 of them living in New London County.

³ For details see Appendix 4.

- Purchases (intermediate demand for the hotel industry) accounted for \$7.4 million with almost 60% being from New London County.
- Tourism expenditures were calculated based on an approximation of the average daily number of the MPTN visitors (41,000), 60% of whom are day-trippers with the rest staying in hotels and motels (survey results, see Appendix 4).

Transfers to state and local governments (fiscal year 1999 figures):

- \$174 million in transfers to the State of Connecticut for gaming rights in 1999 (accumulated transfers reached \$1 billion in January 2000).
- \$2.3 million in property taxes paid to the neighboring towns.
- MPTN payments to the State of Connecticut for regulatory fees (State Police, Liquor Control Division and Division of Special Revenue) were \$4.4 million.

Pequot Pharmaceutical Network (PRxN):

- Purchases of pharmaceuticals accounted for \$15.4 million in fiscal year 1999.

Work ETC (education, transportation and childcare):

- Since 1997 the program trained and employed more than 150 Connecticut residents on welfare who were seeking a new job or return to the workforce.

Amenity values (crime, traffic and congestion costs) in the neighboring towns of Ledyard, Preston and North Stonington:⁴

- Non-casino crime is essentially unchanged since the introduction of Foxwoods Resort Casino.
- Traffic and congestion costs accounted for \$53,394 in fiscal year 1999 (see Appendix 2).

Results

The operations of the Mashantucket Pequot Tribal Nation are not limited to the direct effect of the variables described earlier in this report. These effects in the model

economy lead to additional spillover effects throughout broader New London County and Connecticut. Tables 2 and 3 and Figures 1-4 show the combined direct and spillover effects on several key variables.

Table 2 and Figures 1 and 2 indicate the impact of the MPTN Foxwoods Resort Casino related operations on Gross Regional Product (GRP) and aggregate personal income of New London County and the State of Connecticut. Variables listed as annual averages indicate the amount on average we can expect that variable to change in a given year from the baseline or status quo REMI forecast. Expressed this way, these variables are useful in describing the overall impact. The time paths of these variables, illustrated in the figures below, indicate the expected changes in each specific year. Figures help to visualize the dynamics of the effects of the impact.

Table 2 shows that current MPTN operations on average annually contribute \$805 million to the GRP of New London County, or 8.54 percent of the County's GRP. At the State level, MPTN operations annually account for \$1.2 billion (almost 1%) of Gross State Product and \$1.9 billion (1.01 percent) of Connecticut's personal income. Figures 1 and 2 present the dynamics of the impact. They suggest, for example, that by the year 2019, MPTN Foxwoods Resort Casino related operations could account for more than \$2.6 billion in additional (above the baseline forecast) aggregate personal income in the State of Connecticut, of which \$1.6 billion is in New London County.

⁴ For details of estimation procedures see Appendix 2 of this report.

Table 2. The economic effects of MPTN Foxwoods Resort Casino related operations on GRP and personal income of New London County and the State of Connecticut (2000-2019). Numbers represent annual average changes from the baseline forecast of the New London and Connecticut economies.

	<i>New London County</i>		<i>Connecticut</i>	
	<i>Level change</i>	<i>Percent change</i>	<i>Level change</i>	<i>Percent change</i>
GRP	805 Mil 92\$	8.54%	1,228 Mil 92\$	0.89%
Personal Income	1,145 Mil Nom \$	10.15%	1,913 Mil Nom \$	1.01%

Note: GRP is gross regional product, the region being either a county or the State.

Figure 1. Economic Impact of MPTN Foxwoods Resort Casino operations on Gross State Product and Personal Income of the State of Connecticut

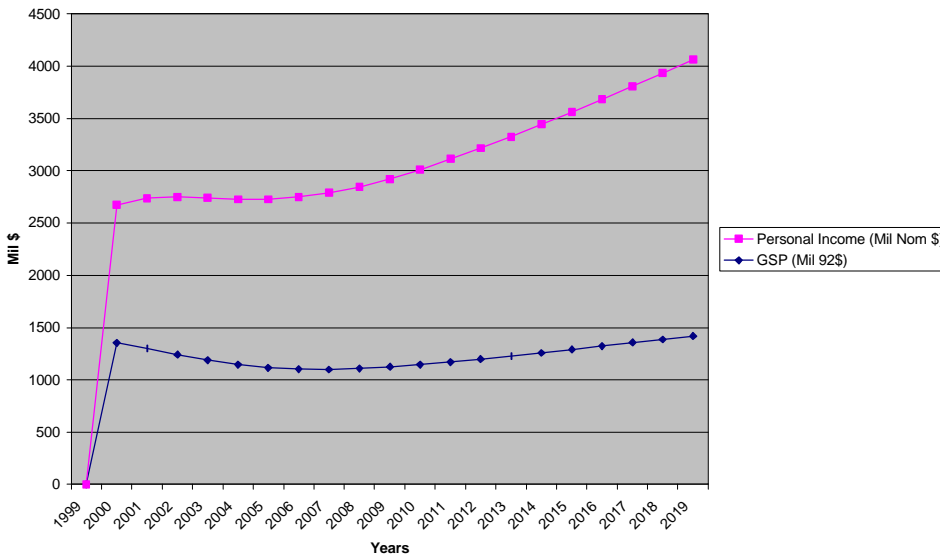


Figure 2. Economic Impact of MPTN Foxwoods Resort Casino operations on Gross Regional Product and Personal Income of New London County

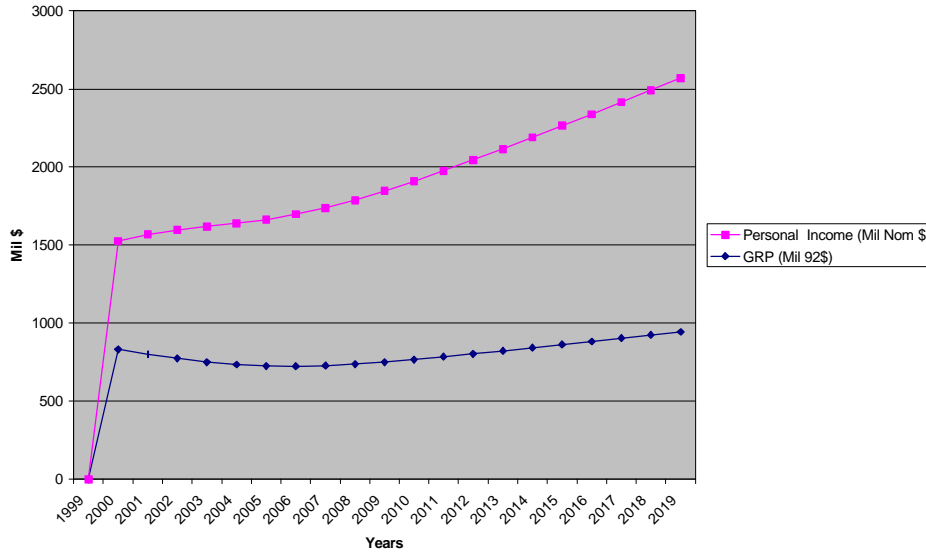


Table 3 and Figures 3 and 4 indicate the impact of the Foxwoods Resort Casino related operations on total employment and population of New London County and the State of Connecticut. Table 3 shows that MPTN operations on average annually contribute 41,363 jobs to the economy of the State of Connecticut, with 31,358 of these in New London County. The total employment impact of MPTN operations on New London County is significant, representing 17.83 percent of its total employment. Further, the employment effect on the towns of Ledyard, Preston and North Stonington is even greater, as 80.4 percent of the total number of employees of the MPTN in Connecticut live in those towns (see Appendix 2).

Population exhibits a similar trend to GSP, employment, and personal income. MPTN operations add an annual average increase in population of 49,991 to Connecticut, with 36,205 going to New London County. The availability of new jobs in New London County will not only induce migrants to move into the area, but also spillover relative

employment opportunities to the surrounding area and the entire State. Figures 3 and 4 show the dynamic pattern of population increase for both State and New London County.

Table 3. The economic effects of MPTN Foxwoods Resort Casino related operations on total employment and population of New London County and the State of Connecticut (2000-2019). Numbers represent annual average changes from the baseline forecast of the New London and Connecticut economies.

	<i>New London County</i>		<i>Connecticut</i>	
	<i>Level change</i>	<i>Percent change</i>	<i>Level change</i>	<i>Percent change</i>
Total Employment	31,358	17.83%	41,363	1.80%
Population	36,205	13.75%	49,991	1.46%

Figure 3. Economic Impact of MPTN Foxwoods Resort Casino operations on Employment and Population of the State of Connecticut

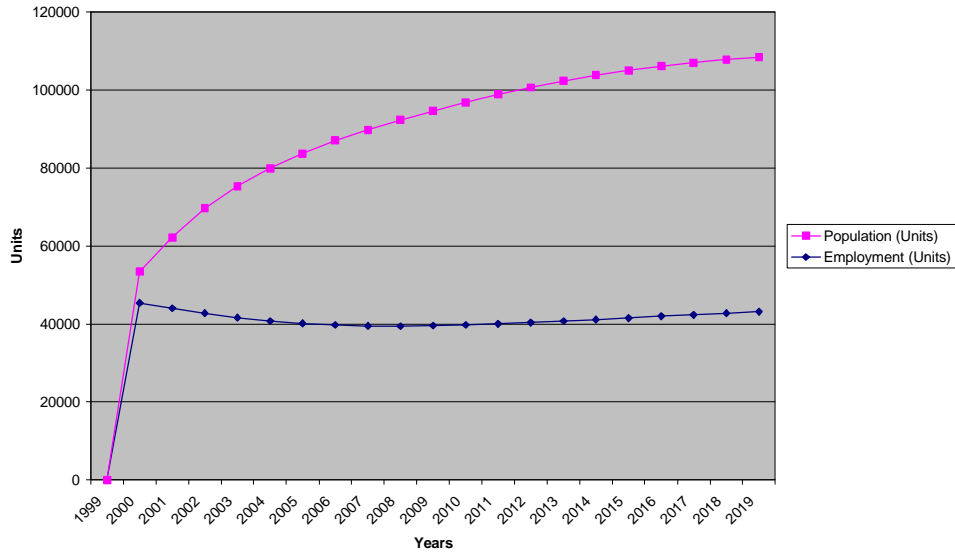
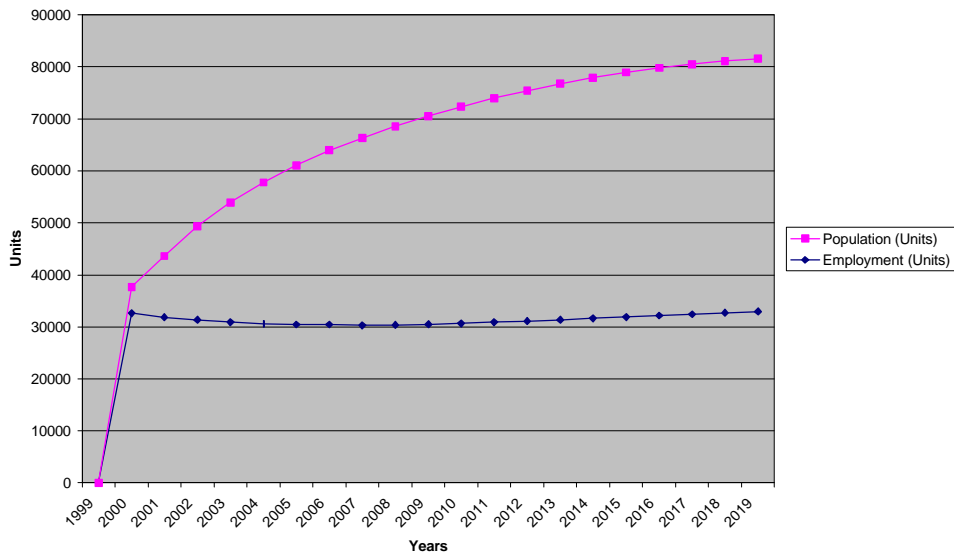


Figure 4. Economic Impact of MPTN Foxwoods Resort Casino operations on Employment and Population of New London County



The analysis of key economic variables shows that MPTN Foxwoods Resort Casino and related operations have substantial positive economic impacts on both New London County and the entire State, as measured by changes in GSP, employment, personal income, and population.

Conclusions

The MPTN operates a wide range of businesses, including the Foxwoods Resort Casino, several off-reservation hotels, and, the Mashantucket Pequot Museum. These operations have indirect and induced economic effects on New London County and the State of Connecticut. This report examines three key economic variables: the Gross Regional Product (GRP), personal income and employment.

GRP Impact: MPTN operations contribute \$1.2 billion to Gross State Product, with \$805 million attributed to New London County.

Personal Income Impact: Foxwoods Resort Casino and related operations result in an additional \$1.9 billion in Connecticut's personal income with \$1.1 billion credited to New London County.

Employment and Population Impact: the Tribe's operations generate 41,363 additional jobs in Connecticut, with 31,358 of these in New London County. The availability of new jobs in New London County and the State attracts migrants to the area, so the projected effect of MPTN operations is to bring an additional 49,991 people into Connecticut.

Appendix 1: Connecticut Economic Model

In 1992, with funding from the Connecticut Department of Economic and Community Development (DECD), the Department of Economics at the University of Connecticut acquired a microcomputer-based economic model of the Connecticut economy from Regional Economic Models, Inc. (REMI). A Massachusetts-based firm with historical ties to the University of Massachusetts, REMI has expertise in regional economic modeling and is a leading supplier and developer of such models. Following its acquisition of the model, the Department of Economics at the University of Connecticut began the formal process of creating the Connecticut Center for Economic Analysis (CCEA).

The REMI model includes all of the major inter-industry linkages among 466 private industries, which are aggregated into some 49 major industrial sectors. With the addition of farming and three public sectors (state & local government, civilian federal government, and military), there is a total of 53 sectors represented in the model.

At the core of the model are the results of extensive modeling efforts at the U.S. Department of Commerce (DoC). The DoC has developed, and continues to develop, an *input-output model (or I/O model)* for the United States. Modern input-output models are largely the result of groundbreaking research by Nobel laureate Wassily Leontief. They focus on the interrelationships between industries, and provide micro-level detail regarding factor markets (including the labor market), intermediate goods production, as well as final goods production and consumption. Conceptually, the model is constructed in the form of a table, a kind of cross-reference, in which each cell summarizes the sales-purchase relation between industries or sectors.

An example may help to make clear the value of this structure. Suppose that one cell changes; wages for labor rise in one specific sector. The labor cell in that sector would change. Then, the change would flow through the table, affecting inputs and outputs in other industries along the chain of production. At the same time, businesses

might substitute capital machinery (automation) or other inputs that appear more cost effective as a result of the change. This would offset, to some extent, the rising cost of labor. Workers may attempt to shift their employment to the sector with higher wages. That is, all of the elements of the model, just like the economy it represents, are related to all other elements of the model.

The REMI Connecticut model takes the U.S. I/O “table” results and scales them according to traditional regional relationships and current conditions, allowing the relationships to adapt at reasonable rates to changing conditions. Additionally:

- Consumption is determined on an industry-by-industry basis, from real disposable income in a Keynesian fashion, i.e. prices are fixed in the short run and gross domestic product (GDP) is determined entirely by aggregate demand.
- Wage income is related to sector employment and is factored by regional differences.
- Property income depends only on population and its distribution, adjusted for traditional regional differences, not on market conditions or building rates relative to business activity.
- Estimates of transfer payments depend upon unemployment details of the previous period. Moreover, government expenditures are proportional to the size of the population.
- Federal military and civilian employment is exogenous and maintained at a *fixed* share of the corresponding total U.S. values, unless specifically altered in the analysis.
- Migration into and out of the state is estimated and is based on relative wages and the “amenities” of life in Connecticut versus other states.
- “Imports” and “exports” from other states are related to relative prices and production costs in Connecticut versus elsewhere.

Depending on the analysis being performed, the nature of the chain of events cascading through the model economy can be as informative for the policymaker as the final aggregate results. Because the model generates such extensive sectoral detail, it is possible for experienced economists in this field to discern the dominant causal linkages involved in the results.

Appendix 2: Local Economic Impact Analysis

Introduction

Increased road congestion reduces trucking efficiency, increases automobile delay time, fuel costs, accidents and environmental damage. These in turn affect worker and firm location decisions. The following characterizes local economic impacts of congestion, crime, employment and residential values as consequences of MPTN operations.

Employment

Of the total number of employees of the MPTN operations in Connecticut, 80.4 percent comes from New London County and 13 percent comes from the towns of Ledyard, Preston and North Stonington. This shows the employment significance of Foxwoods Resorts Casino in these three towns, especially Ledyard. Based on the study by Wright and Associates (1993), which found that each Foxwoods Resort Casino job supports 1.107 additional non-casino jobs in New London County, we estimate the total number of jobs created per hundred jobs by the MPTN Foxwoods Resort Casino related operations in three towns of Ledyard, Preston and North Stonington.

Table 4. Local Employment Impact of MPTN operations.

<i>Towns</i>	<i>Total number Employed (1998)</i>	<i>Employed by the MPTN (1998)</i>	<i>Percentage of direct employment</i>	<i>Percentage of indirect employment based on 1993 study</i>	<i>Percentage of total employment based on 1993 study</i>
<i>Ledyard</i>	7759	779	10.03	10.7	20.7
<i>Preston</i>	2678	218	8.14	8.5	16.7
<i>North Stonington</i>	2762	218	7.89	8.4	16.3

Therefore approximately 21 percent of total employment in Ledyard is accountable to MPTN operations alone. Similarly, for Preston it is 17 percent and for

North Stonington it is 16.3 percent. Moreover, the importance of increasing employment becomes obvious when we observe the upward pressure in property values in this area. This of course was offset by the contraction of the private sector and military in the area during the early and mid 1990s.

Traffic and congestion costs

We consider traffic volume on Route 2 starting from its end of overlapping Route 12 to the exit from I- 95 northbound to Route 281. According to the Connecticut Department of Transportation Traffic Logs of 1989 and 1998, traffic volume has increased by 81 percent. Given that that stretch of road is 14.79 miles long, the increased number of miles per 100 vehicles is 1198. To measure the cost of increased traffic, we used the *Federal Highway Cost Allocation Study* (1997) that gives estimates of marginal costs for the year 2000. Marginal cost captures the idea of the increase in cost due to a per mile increase in traffic volume. In order to calculate the cost due to increased traffic, we take pavement maintenance, congestion, accidents and noise into consideration and then aggregate to get the total. We take the weighted average of the vehicle mix (70 percent autos, 20 percent 40 kip 4 axle & 10 percent 60 kip 4 axle) to estimate the total cost. Table 2 shows the results.

Table 2. Estimates of marginal pavement, congestion, accident, and noise costs for selected vehicles in 2000.⁵

<i>Marginal Costs (cents per vehicle mile)</i>					
<i>Vehicle class</i>	Pavement	Congestion	Crash	Noise	Total
<i>Autos rural interstate</i>	0	0.78	0.98	0.01	1.77
<i>40 kip 4 axle s.u. truck</i>	1.0	2.45	0.47	0.09	9.08
<i>60 kip 4 axle s.u. truck</i>	5.6	3.27	0.47	0.11	9.45

Note: s.u. = single unit

Source: CT Department of Transportation

⁵ Congestion costs are measured in terms of the value of excess travel time due to traffic congestion; accident costs include medical costs, lost productivity, property damage, pain and suffering, and other costs related to accidents. Marginal cost represents the weighted average of marginal costs estimated for a broad cross section of highways.

The approximate total cost in the year 2000 thus is estimated to be \$ 76,276 from the increased traffic volume on this section of Route 2 *only*. We assume 70 % of this cost (\$53,354) is due to Foxwoods Resort Casino. This cost is biased downwards, as we have not taken the cost due to pollution into consideration. These costs would be borne by the three Towns.

Crime Rates

Public opposition to the spread of casino gaming has been driven mainly by fears of adverse social impacts. Some examples are neighborhood crime issues linked to casinos, such as robberies, larceny, loan sharking, and drug dealing. A study covering 1990 to 1998 (The Connecticut Economy, Summer 1999) shows that over these years the crime rate decreased statewide by 29.7 percent. In the New London Labor Market Area alone it has declined by 10.8 percent. According to the study the crime rate in Ledyard has increased by more than 300 percent. However, if we disaggregate the total crime in the Town of Ledyard as ‘in casino’ and ‘out of casino’ crimes, then it is true that crime in Ledyard per thousand people has increased by only 70 percent. In North Stonington the crime rate has increased by 14 percent and in Preston it decreased by 31 percent measured as crimes per thousand people. Table 3 illustrates these conclusions.

Table 3. Crime per 1000 people and the percentage change (1990-1998).

<i>Town</i>	<i>1990</i>	<i>1998</i>	<i>Percent change</i>
<i>Ledyard ('out of casino' crime only)</i>	14.3	24.5	+70
<i>Preston</i>	18.0	12.3	-31.4
<i>North Stonington</i>	18.4	21.0	+14.1

Data Source: Connecticut Department of Public Safety

However, considering ‘out of casino’ crimes only, the effect of Foxwoods Resort Casino on crime in the area is minimal. The statistics for crimes (as shown in the data provided by the Department of Public Safety) in the years 1990 to 1992 does not take into account Part II crimes, such as ‘disorderly conduct’, ‘driving under the influence’, ‘runaways’ and ‘vandalism’, which contribute approximately 50 percent of the crimes

committed in the three towns from 1993 to 1998. In fact, the abrupt jump in number of crimes from the year 1992 to 1993 is mainly due to the addition of Part II crimes described above. Thus, crime estimates as given by the Department of Public Safety for these years are biased downwards. In fact, the total number of ‘out of casino’ crimes in Ledyard declined from 535 in 1993 to 364 in 1998. ‘In casino’ crimes also show a decline from 1,212 in 1994 to 989 in 1998 with 60 percent of them being larceny. Table 4 summarizes these numbers.

Table 4. Total Crimes in the Town of Ledyard

<i>Year</i>	<i>In Casino Crime</i>	<i>Out of Casino Crime</i>	<i>Total Crimes</i>
<i>1990</i>	-	-	214
<i>1991</i>	-	-	214
<i>1992</i>	-	-	283
<i>1993</i>	496	535	1031
<i>1994</i>	1212	573	1785
<i>1995</i>	1231	542	1773
<i>1996</i>	828	523	1351
<i>1997</i>	757	541	1298
<i>1998</i>	989	364	1353

Data Source: Division of State Police, Crimes & Data Analysis Unit, Department of Public Safety.

Note: Prior to 1993 we have only index crime data for Ledyard. From 1993 onwards crimes are separated into ‘in casino’ and ‘out of casino’ crimes.

Aggregating over these three Towns, we conclude that ‘out of casino’ crimes have increased only marginally. Moreover, the MPTN contributes regulatory fees to the Connecticut State Police and Liquor Control Division, which accounted for \$4.4 million in the fiscal year 1999. The State Police prosecute crimes on the reservation.

Property Value Analysis

This part of the study analyzes the impact of the Foxwoods Resort Casino and related operations of the Mashantucket Pequot Tribal Nation on surrounding residential property values. Specifically, we analyze the annual growth rate of residential property values (proxied by the property sale price) in Ledyard, North Stonington, and Preston, and, compare this trend with the annual growth rate of residential property in the Hartford LMA.

When performing a study on residential properties, one needs to guarantee that the properties' characteristics do not change during the study period. There are different ways to arrive at a consistent calculation. One is the conventional method in the appraisal profession, that is, extract properties of constant quality that are sold more than once during the study period, and calculate the sales price change for these properties. An alternative method is to conduct an econometric analysis on the property sales prices controlling for the characteristics of the properties, and then use the estimates from the model to calculate the predicted property value growth rate for a specific menu of characteristics. Due to a limitation of the available data on property characteristics in the three towns (see the next section), we choose to use the first method, that is, matching properties that have been sold more than once.

In order to separate the Casino's impact on housing prices from the general trend in the housing market from 1981 to 1999, we separate the study period into two periods, 1981-1989 and 1990-1999. The reason we use 1990 as the break point instead of 1992, the year when the Casino opened its doors, is to take into consideration people's expectation of the Casino's future impact on housing price trends.

The impact of the Foxwoods Resort Casino on the adjacent three towns' property values can be found by comparing the housing price trend in these three towns with the trend in a broader or different geographical area. Due to the irregular behavior of

housing prices in the southwest area of Connecticut, for example, Fairfield County, we use the Hartford LMA as the basis for comparison.

The housing sales price data is extracted from two sources. We obtained housing sales data for 1990-1999, for the three towns from the home sales website of Dow Jones & Company, Inc.⁶ Because this data does not provide the characteristics of the transacted properties, we were unable to perform the econometric analysis described above. Instead, we used the matching property method to conduct the analysis. The Center for Real Estate and Urban Studies at the University of Connecticut provided the housing sales data for 1981 through 1989.⁷ The annual growth rate of the constant quality house price for the Hartford LMA was obtained from the Center for Real Estate as well.⁸

We obtained 683 sales records by matching properties that were sold more than once during 1981-1989 in the three towns. The mean annual growth rate of these house prices is 11.42%, compared to a 9.03% annual growth rate in the Hartford LMA. Note that these growth rates as well as the other growth rates used in this report are based on nominal prices. That is, the sales prices at each date are not adjusted for inflation. Therefore, part of the price increase is due to inflation rather than increased property value. Our conclusion is unaffected despite these nominal growth rates. For the second period, 1990-1999, we obtained 251 matched sales in the three towns adjacent to Foxwoods Resort Casino. These properties' sales price growth rate averages 0.57% annually, compared to a -1.16% annual growth rate for the Hartford LMA during the same time period. Table 5 summarizes the descriptive statistics for the housing sales trend for the three towns and the Hartford LMA during the two periods.

⁶ The address is www.homes.wsj.com.

⁷ This data was archived from OPM original records.

⁸ These price indices are constructed through an econometric analysis by controlling the housing characteristics, and track the value of the standardized house over time. They are not the actual housing sales prices, but the prediction of the sales price if the standardized house is on sale at a certain time. For detailed methodology, see Clapp and Giaccotto (1994).

Table 5 demonstrates that during the first period, 1980-1989, the three towns enjoyed a much larger increase in property value relative to the Hartford LMA. This is partly due to the attractiveness of the (near) waterfront properties in these three towns. It can also be attributed partly to the increased demand for housing as people migrated to this area to fill the high paid jobs in the defense industry. Table 5 also shows that there is a sharp decline in the housing price growth rate for both geographical regions. The average annual housing price growth rate for Hartford LMA plunges from 9.03% in 1980-1989 to -1.16% in 1990-1999. This sharp decline in housing price trend during the 1990s is attributed to the recession in the early 1990s. For the three-town area, the hit was even harder. About the same time the housing market plunged due to a larger cycle, the defense industry began contracting its facilities in the New London region. If it were not for the Foxwoods Resort Casino that started its operation in 1992 and immediately pumped thousands of new jobs into the surrounding area, the decline in housing prices in this area would have been more dramatic than in the Hartford LMA. Although there is also a decline in the growth rate in housing prices in the three towns adjacent to the Casino relative to the 1980s, the decline is much less dramatic than in the Hartford LMA. As a result of Foxwoods Resort Casino and related operations, property value growth rates in the three adjacent towns were actually *positive* compared to the Hartford LMA. Instead of losing value over time, the properties in the three adjacent towns have slowly *increased* their value. Statistical tests show that the median annual growth rate of housing prices in the three towns is significantly higher than in the Hartford LMA in both periods (see Table 6). This result is consistent with the findings in another study on the Foxwoods Resort Casino in 1993 by Arthur Wright and Associates.

Table 5: Summary Statistics of Annual Housing Price Growth Rate

	Average Annual Growth Rate		Median Annual Growth Rate	
	1981-1989	1990-1999	1981-1989	1990-1999
Towns of Ledyard, North Stonington, Preston	11.42%	0.57%	12%	1%
Hartford LMA	9.03%	-1.16%	6.61%	-2.06%

Table 6:.....Statistical Tests of Median Annual Growth Rate

	z-statistics	Critical Value (95% confidence level)
1980-1989	18.48	2
1990-1999	7.51	2

We conclude that the development of the Foxwoods Resort Casino and other MPTN operations in New London County dampened the recession in employment and housing prices in the early 1990s and contributed substantially to the economic rebound of the region through the decade. This included a positive return to housing investment.

Appendix 3: REMI Output Tables

Appendix Table 1. Summary Table of the impact of Foxwoods Casino and related MPTN operations on New London County.

	2000	2001	2002	2003	2004	2005	2006	2010	2015	2019
Employment (Units)	32,600	31,840	31,370	30,910	30,590	30,420	30,410	30,670	31,900	32,970
Private Non-Farm Employment (Units)	32,080	30,940	30,130	29,400	28,840	28,480	28,310	28,130	29,090	30,130
GRP (Mil 92\$)	831	801	774	751	734	725	725	766	863	945
Personal Income (Mil Nom \$)	695	768	824	867	904	938	973	1,142	1,402	1,626
Disposable Personal Income (Mil Nom \$)	513	576	627	668	703	735	768	918	1,140	1,329
PCE-Price Index 92\$	2.448	3.087	3.313	3.342	3.244	3.072	2.879	2.13	1.539	1.079
Real Disposable Personal Income (Mil 92\$)	317	336	358	379	399	419	440	523	616	679
Population (Units)	5,040	11,760	18,000	23,040	27,190	30,670	33,570	41,660	47,060	48,610

Appendix Table 2. Summary Table of the impact of Foxwoods Casino and related MPTN operations on Connecticut.

	<i>2000</i>	<i>2001</i>	<i>2002</i>	<i>2003</i>	<i>2004</i>	<i>2005</i>	<i>2006</i>	<i>2010</i>	<i>2015</i>	<i>2019</i>
Employment (Units)	45,470	44,000	42,820	41,650	40,730	40,110	39,800	39,790	41,560	43,190
Private Non-Farm Employment (Units)	42,590	40,550	38,900	37,360	36,150	35,290	34,800	34,300	35,830	37,470
GRP (Mil 92\$)	1,353	1,299	1,241	1,188	1,145	1,116	1,103	1,145	1,291	1,420
Personal Income (Mil Nom \$)	1,321	1,437	1,507	1,551	1,583	1,611	1,646	1,866	2,270	2,644
Disposable Personal Income (Mil Nom \$)	983	1,085	1,151	1,195	1,230	1,260	1,295	1,493	1,836	2,148
PCE-Price Index 92\$	0.2544	0.3207	0.344	0.346	0.335	0.317	0.2976	0.23	0.1875	0.1588
Real Disposable Personal Income (Mil 92\$)	625	649	669	685	700	716	735	834	965	1,060
Population (Units)	7,984	18,220	26,850	33,690	39,180	43,640	47,260	57,080	63,520	65,260

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